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THE  
AMERICAN EPHEMERIS

AND

60909

NAUTICAL ALMANAC

FOR THE YEAR

1 8 9 9

*FIRST EDITION*

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*PUBLISHED BY AUTHORITY OF CONGRESS*

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WASHINGTON:  
BUREAU OF EQUIPMENT.  
1896.



## PREFACE.

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THE arrangement of *The American Ephemeris* adopted in the volume for the year 1882, and explained in the Appendix to that volume, has been continued without radical change to the present time.

The additions then made comprise more complete data for eclipses of the sun, diagrams showing the configurations of the satellites of Jupiter, data respecting the disks of Mercury and Venus for the reduction of meridian and photometric observations, and diagrams, with tables, for identifying any known satellites of other planets. The work is divided into three parts, as follows:—

Part I, *Ephemeris for the Meridian of Greenwich*, gives the geocentric and heliocentric positions of the major planets, the Ephemeris of the Sun, and other fundamental astronomical data for equi-distant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington*, gives the ephemerides of the fixed stars, sun, moon, and major planets for transit over the meridian of the New Naval Observatory, Washington. The mean places of the fixed stars and the data for their reduction are also included in this part. The list of mean and apparent places of fixed stars was greatly enlarged in 1885 for the convenience of field-astronomers.

Part III, *Phenomena*, contains predictions of phenomena to be observed, with data for their computation. Washington mean time of the New Naval Observatory is used in this part except in a few cases, notably that of eclipses, where Greenwich mean time was judged more convenient.

SIMON NEWCOMB,

*Professor U. S. Navy,*

*Director Nautical Almanac.*

WASHINGTON, *August*, 1896.



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# CORRECTIONS.

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## *Ephemeris, 1897. (First Edition only.)*

**Page.**

- V, 19th line, *for* 1896.0 *read* 1897.0  
 V, 6th line from bottom, *for* 1896 *read* 1897  
 VII, Byzantine era, the year 7406 begins September 1st  
 315, *for* 12 Cassiopeizæ *read* 21 Cassiopeizæ  
 331, *for* δ Ursæ Majoris *read* θ Ursæ Majoris  
 417, Moon's Greatest Libration, Aug. 25, *for* 25<sup>d</sup> 16<sup>h</sup> 17<sup>m</sup> *read* 25<sup>d</sup> 21<sup>h</sup> 27<sup>m</sup>  
 420, *for* ρ<sup>s</sup> Leonis *read* ρ<sup>s</sup> Leonis

## *Ephemeris, 1898.*

**Page.**

- V, 19th line, *for* 1896.0 *read* 1898.0  
 57, Foot note, *for* south *read* north  
 75, Foot note, *for* decreasing *read* increasing  
 297, Declination of θ Virginis, *for* 5° 59' 40''.36 *read* 4° 59' 40''.36  
 365, 2nd line from bottom of upper ½ page, Mean Solar date, *for* 34.2 *read* 24.2  
 421, Declination of α Cancrī, *for* 16° 58' 22''.30 *read* 15° 58' 22''.30  
 423, *for* θ Sagittarii *read* ο Sagittarii  
 463, 6th line, *for* 462—482 *read* 466—486  
 508, 5th line, *for* " ° ' " *read* s h m s  
 521, 27th line from bottom, *for* log *x* *read* log *x*'  
 524, 21st line from top insert *y*' before the symbol <

# CHRONOLOGICAL ERAS AND CYCLES.

## CHRONOLOGICAL ERAS.

THE YEAR 1899, WHICH COMPRISES THE LATTER PART OF THE 123RD AND THE BEGINNING OF THE 124TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6612 of the Julian Period;

- “ 7407–7408 of the Byzantine era, the year 7408 commencing on September 1st;
- “ 5659–5660 of the Jewish era, the year 5660 commencing on September 5th, or, more exactly, at sunset on September 4th;
- “ 2652 since the foundation of Rome, according to VARRO;
- “ 2646 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th; and, in the notation of astronomers, to the 746th year before the birth of CHRIST;
- “ 2675 of the Olympiads, or the third year of the 669th Olympiad commencing in July, 1899, if we fix the era of the Olympiads at  $775\frac{1}{2}$  years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;
- “ 2211 of the Grecian era, or the era of the SELEUCIDÆ;
- “ 1615 of the era of DIOCLETIAN;
- “ 2559 of the Japanese era and to the 32d year of the period entitled “Meiji.”

The year 1317 of the Mohammedan era, or the era of the Hegira, begins on the 12th day of May, 1899.

The first day of January of the year 1899 is the 2,414,656th day since the commencement of the Julian Period.

## CHRONOLOGICAL CYCLES.

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Lunar Cycle or Golden Number . . . . .	19	Julian Period . . . . .	6612

## SYMBOLS AND ABBREVIATIONS.

### SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁	The Earth.	♆	Neptune.

### SIGNS OF THE ZODIAC.

Spring Signs.	{	1.	♈	Aries.	Autumn Signs.	{	7.	♎	Libra.
		2.	♉	Taurus.			8.	♏	Scorpius.
		3.	♊	Gemini.			9.	♐	Sagittarius.
Summer Signs.	{	4.	♋	Cancer.	Winter Signs.	{	10.	♑	Capricornus.
		5.	♌	Leo.			11.	♒	Aquarius.
		6.	♍	Virgo.			12.	♓	Pisces.

### ASPECTS

- ♌ Conjunction, or having the same Longitude or Right Ascension.
- ☐ Quadrature, or differing 90° in Longitude or Right Ascension.
- ♌ Opposition, or differing 180° in Longitude or Right Ascension.

### ABBREVIATIONS.

♈	Ascending Node.	°	Degrees.
♏	Descending Node.	'	Minutes of Arc.
N.	North.	"	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.

PART I

---

ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF GREENWICH

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
<i>SUN.</i>	1	<sup>h</sup> 18 <sup>m</sup> 47 <sup>s</sup> 28.68	11.037	<sup>°</sup> S. 23 <sup>'</sup> 0 <sup>"</sup> 14.0	+12.52	<sup>'</sup> 16 <sup>"</sup> 18.40	<sup>h</sup> 71.04	<sup>m</sup> 3 <sup>s</sup> 47.32	1.178
Mon.	2	18 51 53.43	11.024	22 54 59.9	13.66	16 18.39	71.00	4 15.43	1.165
Tues.	3	18 56 17.85	11.010	22 49 18.3	14.80	16 18.38	70.95	4 43.21	1.150
Wed.	4	19 0 41.89	10.994	22 43 9.5	+15.93	16 18.36	70.90	5 10.63	1.134
Thur.	5	19 5 5.55	10.977	22 36 33.6	17.06	16 18.34	70.84	5 37.65	1.117
Frid.	6	19 9 28.77	10.959	22 29 30.7	18.17	16 18.31	70.78	6 4.24	1.099
Sat.	7	19 13 51.54	10.939	22 22 1.2	+19.28	16 18.28	70.72	6 30.38	1.079
<i>SUN.</i>	8	19 18 13.82	10.918	22 14 5.1	20.38	16 18.24	70.65	6 56.04	1.058
Mon.	9	19 22 35.59	10.896	22 5 42.9	21.47	16 18.20	70.58	7 21.18	1.036
Tues.	10	19 26 56.82	10.873	21 56 54.6	+22.54	16 18.16	70.50	7 45.78	1.013
Wed.	11	19 31 17.47	10.848	21 47 40.6	23.61	16 18.11	70.42	8 9.81	0.989
Thur.	12	19 35 37.53	10.822	21 38 1.2	24.66	16 18.06	70.34	8 33.25	0.964
Frid.	13	19 39 56.96	10.796	21 27 56.7	+25.70	16 18.00	70.25	8 56.06	0.937
Sat.	14	19 44 15.75	10.769	21 17 27.4	26.73	16 17.94	70.16	9 18.23	0.909
<i>SUN.</i>	15	19 48 33.86	10.740	21 6 33.5	27.74	16 17.88	70.07	9 39.72	0.881
Mon.	16	19 52 51.27	10.711	20 55 15.5	+28.74	16 17.81	69.98	10 0.52	0.852
Tues.	17	19 57 7.98	10.681	20 43 33.5	29.73	16 17.74	69.88	10 20.61	0.822
Wed.	18	20 1 23.95	10.650	20 31 28.1	30.70	16 17.67	69.78	10 39.97	0.791
Thur.	19	20 5 39.16	10.618	20 18 59.5	+31.66	16 17.59	69.68	10 58.58	0.760
Frid.	20	20 9 53.62	10.586	20 6 8.1	32.61	16 17.50	69.58	11 16.43	0.728
Sat.	21	20 14 7.29	10.553	19 52 54.2	33.54	16 17.41	69.48	11 33.50	0.695
<i>SUN.</i>	22	20 18 20.18	10.520	19 39 18.1	+34.45	16 17.32	69.38	11 49.79	0.662
Mon.	23	20 22 32.28	10.487	19 25 20.3	35.35	16 17.22	69.27	12 5.29	0.629
Tues.	24	20 26 43.58	10.454	19 11 1.0	36.24	16 17.11	69.16	12 19.99	0.596
Wed.	25	20 30 54.07	10.420	18 56 20.7	+37.11	16 17.00	69.05	12 33.89	0.562
Thur.	26	20 35 3.75	10.387	18 41 19.7	37.96	16 16.88	68.94	12 46.98	0.528
Frid.	27	20 39 12.62	10.353	18 25 58.3	38.80	16 16.75	68.83	12 59.26	0.495
Sat.	28	20 43 20.68	10.319	18 10 16.9	+39.63	16 16.62	68.71	13 10.72	0.461
<i>SUN.</i>	29	20 47 27.93	10.285	17 54 15.9	40.44	16 16.49	68.60	13 21.39	0.428
Mon.	30	20 51 34.37	10.251	17 37 55.7	41.23	16 16.35	68.49	13 31.25	0.394
Tues.	31	20 55 40.00	10.218	17 21 16.6	42.01	16 16.20	68.38	13 40.30	0.360
Wed.	32	20 59 44.82	10.184	S. 17 4 19.1	+42.77	16 16.05	68.26	13 48.54	0.327

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
<i>SUN.</i>	1	<sup>h</sup> 18 <sup>m</sup> 47 <sup>s</sup> 27.98	11.034	<sup>°</sup> S. 23 <sup>'</sup> 0 <sup>"</sup> 14.9	+12.51	<sup>m</sup> 3 <sup>s</sup> 47.24	1.178	<sup>h</sup> 18 <sup>m</sup> 43 <sup>s</sup> 40.74
Mon.	2	18 51 52.65	11.021	22 55 0.9	13.65	4 15.34	1.164	18 47 37.30
Tues.	3	18 56 16.98	11.006	22 49 19.5	14.79	4 43.12	1.150	18 51 33.86
Wed.	4	19 0 40.94	10.990	22 43 10.9	+15.92	5 10.53	1.134	18 55 30.42
Thur.	5	19 5 4.52	10.973	22 36 35.2	17.05	5 37.54	1.117	18 59 26.97
Frid.	6	19 9 27.66	10.955	22 29 32.6	18.16	6 4.13	1.099	19 3 23.53
Sat.	7	19 13 50.35	10.935	22 22 3.3	+19.27	6 30.26	1.079	19 7 20.09
<i>SUN.</i>	8	19 18 12.56	10.914	22 14 7.5	20.37	6 55.91	1.058	19 11 16.65
Mon.	9	19 22 34.26	10.893	22 5 45.5	21.46	7 21.05	1.036	19 15 13.21
Tues.	10	19 26 55.41	10.870	21 56 57.6	+22.53	7 45.65	1.013	19 19 9.76
Wed.	11	19 31 16.00	10.845	21 47 43.9	23.60	8 9.67	0.989	19 23 6.32
Thur.	12	19 35 35.99	10.820	21 38 4.8	24.65	8 33.11	0.964	19 27 2.88
Frid.	13	19 39 55.36	10.794	21 28 0.6	+25.69	8 55.92	0.937	19 30 59.44
Sat.	14	19 44 14.08	10.767	21 17 31.6	26.72	9 18.09	0.909	19 34 55.99
<i>SUN.</i>	15	19 48 32.13	10.738	21 6 38.0	27.73	9 39.58	0.881	19 38 52.55
Mon.	16	19 52 49.49	10.708	20 55 20.3	+28.73	10 0.38	0.852	19 42 49.11
Tues.	17	19 57 6.13	10.678	20 43 38.7	29.72	10 20.47	0.822	19 46 45.66
Wed.	18	20 1 22.05	10.647	20 31 33.6	30.69	10 39.83	0.791	19 50 42.22
Thur.	19	20 5 37.22	10.616	20 19 5.4	+31.65	10 58.44	0.760	19 54 38.78
Frid.	20	20 9 51.63	10.584	20 6 14.2	32.60	11 16.29	0.728	19 58 35.34
Sat.	21	20 14 5.26	10.552	19 53 0.7	33.53	11 33.37	0.695	20 2 31.89
<i>SUN.</i>	22	20 18 18.11	10.519	19 39 24.9	+34.44	11 49.66	0.662	20 6 28.45
Mon.	23	20 22 30.17	10.486	19 25 27.4	35.34	12 5.16	0.629	20 10 25.01
Tues.	24	20 26 41.43	10.453	19 11 8.5	36.23	12 19.86	0.596	20 14 21.56
Wed.	25	20 30 51.89	10.419	18 56 28.5	+37.10	12 33.77	0.562	20 18 18.12
Thur.	26	20 35 1.54	10.386	18 41 27.8	37.95	12 46.86	0.529	20 22 14.68
Frid.	27	20 39 10.38	10.352	18 26 6.7	38.79	12 59.15	0.495	20 26 11.23
Sat.	28	20 43 18.41	10.318	18 10 25.7	+39.62	13 10.62	0.461	20 30 7.79
<i>SUN.</i>	29	20 47 25.64	10.284	17 54 25.0	40.43	13 21.29	0.428	20 34 4.34
Mon.	30	20 51 32.06	10.250	17 38 5.1	41.22	13 31.16	0.394	20 38 0.90
Tues.	31	20 55 37.67	10.217	17 21 26.3	42.00	13 40.21	0.360	20 41 57.46
Wed.	32	20 59 42.48	10.184	S. 17 4 29.0	+42.76	13 48.46	0.327	20 45 54.01

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,  
+9°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	1	280 54 59.7	54 42.0	152.87	— 0.31	9.9926600	+ 0.7	h m s 5 15 27.44
2	2	281 56 8.6	55 50.8	152.88	0.36	9.9926629	1.8	5 11 31.52
3	3	282 57 17.9	56 59.8	152.89	0.39	9.9926684	2.8	5 7 35.61
4	4	283 58 27.4	58 9.2	152.90	— 0.39	9.9926763	+ 3.8	5 3 39.70
5	5	284 59 37.0	59 18.5	152.90	0.37	9.9926864	4.7	4 59 43.79
6	6	286 0 46.7	0 28.1	152.91	0.31	9.9926989	5.6	4 55 47.88
7	7	287 1 56.6	1 37.9	152.91	— 0.23	9.9927131	+ 6.4	4 51 51.96
8	8	288 3 6.5	2 47.6	152.91	— 0.12	9.9927294	7.2	4 47 56.05
9	9	289 4 16.3	3 57.2	152.90	0.00	9.9927473	7.9	4 44 0.14
10	10	290 5 25.9	5 6.6	152.90	+ 0.12	9.9927670	+ 8.6	4 40 4.23
11	11	291 6 35.4	6 15.9	152.89	0.26	9.9927884	9.3	4 36 8.32
12	12	292 7 44.5	7 24.9	152.87	0.39	9.9928114	9.9	4 32 12.40
13	13	293 8 53.1	8 33.3	152.85	+ 0.50	9.9928359	+10.6	4 28 16.49
14	14	294 10 1.2	9 41.2	152.83	0.59	9.9928621	11.3	4 24 20.58
15	15	295 11 8.6	10 48.5	152.80	0.67	9.9928901	12.0	4 20 24.67
16	16	296 12 15.4	11 55.1	152.77	+ 0.72	9.9929197	+12.7	4 16 28.76
17	17	297 13 21.4	13 0.9	152.73	0.75	9.9929512	13.5	4 12 32.85
18	18	298 14 26.5	14 5.9	152.69	0.73	9.9929846	14.3	4 8 36.94
19	19	299 15 30.6	15 9.8	152.65	+ 0.70	9.9930200	+15.2	4 4 41.03
20	20	300 16 33.8	16 12.9	152.61	0.63	9.9930576	16.1	4 0 45.11
21	21	301 17 36.0	17 14.9	152.57	0.53	9.9930975	17.1	3 56 49.20
22	22	302 18 37.2	18 15.9	152.53	+ 0.42	9.9931398	+18.1	3 52 53.29
23	23	303 19 37.4	19 16.0	152.49	0.30	9.9931846	19.1	3 48 57.38
24	24	304 20 36.6	20 15.0	152.45	0.17	9.9932318	20.2	3 45 1.47
25	25	305 21 35.0	21 13.3	152.41	+ 0.03	9.9932818	+21.3	3 41 5.56
26	26	306 22 32.2	22 10.3	152.37	— 0.10	9.9933343	22.4	3 37 9.65
27	27	307 23 28.5	23 6.5	152.33	0.21	9.9933895	23.5	3 33 13.74
28	28	308 24 23.9	24 1.7	152.30	— 0.30	9.9934473	+24.6	3 29 17.83
29	29	309 25 18.5	24 56.2	152.26	0.37	9.9935076	25.6	3 25 21.92
30	30	310 26 12.3	25 49.8	152.23	0.40	9.9935703	26.6	3 21 26.01
31	31	311 27 5.2	26 42.6	152.19	0.42	9.9936355	27.6	3 17 30.10
32	32	312 27 57.3	27 34.5	152.15	— 0.40	9.9937031	+28.5	3 13 34.19
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .0.								Diff. for 1 Hour, — 9 <sup>h</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	
	' "	' "	' "	"	' "	"	h m	m	d
1	14 50.6	14 53.4	54 21.9	+0.77	54 32.1	+0.94	15 44.1	1.72	19.0
2	14 56.8	15 0.7	54 44.5	1.12	54 59.0	1.30	16 25.4	1.73	20.0
3	15 5.3	15 10.4	55 15.7	1.48	55 34.5	1.66	17 7.7	1.80	21.0
4	15 16.1	15 22.4	55 55.5	+1.83	56 18.5	+1.99	17 52.2	1.91	22.0
5	15 29.1	15 36.3	56 43.3	2.14	57 9.8	2.26	18 39.9	2.08	23.0
6	15 43.9	15 51.7	57 37.6	2.35	58 6.3	2.41	19 32.1	2.28	24.0
7	15 59.7	16 7.5	58 35.4	+2.42	59 4.3	+2.38	20 29.2	2.48	25.0
8	16 15.2	16 22.4	59 32.5	2.28	59 59.1	2.12	21 30.9	2.64	26.0
9	16 29.1	16 34.9	60 23.4	1.90	60 44.7	1.62	22 35.2	2.70	27.0
10	16 39.7	16 43.2	61 2.3	+1.28	61 15.5	+0.90	23 39.6	2.64	28.0
11	16 45.6	16 46.5	61 24.0	+0.49	61 27.3	+0.06	0		29.0
12	16 45.9	16 44.0	61 25.4	-0.37	61 18.3	-0.79	0 41.4	2.50	0.5
13	16 40.8	16 36.3	61 6.4	-1.18	60 50.0	-1.52	1 39.3	2.33	1.5
14	16 30.8	16 24.5	60 29.9	1.81	60 6.6	2.04	2 33.3	2.18	2.5
15	16 17.5	16 10.0	59 40.9	2.21	59 13.5	2.32	3 24.2	2.07	3.5
16	16 2.3	15 54.6	58 45.3	-2.37	58 16.7	-2.37	4 13.1	2.01	4.5
17	15 46.8	15 39.3	57 48.3	2.33	57 20.8	2.25	5 1.2	2.00	5.5
18	15 32.2	15 25.4	56 54.4	2.13	56 29.5	2.00	5 49.2	2.01	6.5
19	15 19.1	15 13.3	56 6.3	-1.85	55 45.0	-1.69	6 38.0	2.05	7.5
20	15 8.0	15 3.3	55 25.7	1.52	55 8.5	1.35	7 27.7	2.09	8.5
21	14 59.2	14 55.6	54 53.3	1.18	54 40.1	1.02	8 18.1	2.11	9.5
22	14 52.5	14 50.0	54 28.8	-0.85	54 19.5	-0.70	9 8.8	2.10	10.5
23	14 47.9	14 46.3	54 11.9	0.56	54 6.0	0.42	9 58.7	2.06	11.5
24	14 45.1	14 44.4	54 1.7	0.30	53 58.9	-0.17	10 47.3	1.99	12.5
25	14 44.0	14 44.0	53 57.6	-0.06	53 57.6	+0.05	11 34.0	1.90	13.5
26	14 44.3	14 45.0	53 58.8	+0.15	54 1.3	0.26	12 18.7	1.82	14.5
27	14 46.0	14 47.4	54 5.0	0.36	54 10.0	0.46	13 1.7	1.76	15.5
28	14 49.1	14 51.1	54 16.2	+0.57	54 23.6	+0.68	13 43.4	1.73	16.5
29	14 53.5	14 56.3	54 32.4	0.79	54 42.6	0.90	14 24.8	1.72	17.5
30	14 59.4	15 3.0	54 54.2	1.02	55 7.3	1.15	15 6.5	1.76	18.5
31	15 7.0	15 11.4	55 21.9	1.28	55 38.1	1.42	15 49.6	1.84	19.5
32	15 16.3	15 21.5	55 56.0	+1.55	56 15.4	+1.68	16 35.1	1.96	20.5



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 1.					TUESDAY 3.				
0	h m s	s	N. ° ' "	"	0	h m s	s	S. ° ' "	"
1	10 1 29.90	1.8405	7 42 0.1	11.962	1	11 29 47.40	1.8637	2 19 10.3	12.829
2	10 3 20.30	1.8395	7 30 1.4	11.996	2	11 31 39.28	1.8658	2 32 0.1	12.830
3	10 5 10.64	1.8385	7 18 0.6	12.029	3	11 33 31.30	1.8681	2 44 49.9	12.830
4	10 7 0.92	1.8376	7 5 57.9	12.061	4	11 35 23.45	1.8703	2 57 39.7	12.830
5	10 8 51.15	1.8368	6 53 53.3	12.092	5	11 37 15.74	1.8727	3 10 29.5	12.828
6	10 10 41.34	1.8361	6 41 46.8	12.124	6	11 39 8.17	1.8752	3 23 19.1	12.827
7	10 12 31.48	1.8353	6 29 38.4	12.155	7	11 41 0.76	1.8778	3 36 8.7	12.825
8	10 14 21.58	1.8348	6 17 28.2	12.184	8	11 42 53.50	1.8803	3 48 58.1	12.822
9	10 16 11.65	1.8342	6 5 16.3	12.212	9	11 44 46.40	1.8830	4 1 47.3	12.817
10	10 18 1.68	1.8336	5 53 2.7	12.241	10	11 46 39.46	1.8858	4 14 36.2	12.812
11	10 19 51.68	1.8331	5 40 47.4	12.269	11	11 48 32.69	1.8886	4 27 24.8	12.807
12	10 21 41.65	1.8327	5 28 30.4	12.297	12	11 50 26.09	1.8914	4 40 13.0	12.799
13	10 23 31.60	1.8323	5 16 11.8	12.322	13	11 52 19.66	1.8944	4 53 0.7	12.792
14	10 25 21.53	1.8321	5 3 51.7	12.348	14	11 54 13.42	1.8975	5 5 48.0	12.784
15	10 27 11.45	1.8318	4 51 30.0	12.374	15	11 56 7.36	1.9006	5 18 34.8	12.776
16	10 29 1.35	1.8317	4 39 6.8	12.398	16	11 58 1.49	1.9038	5 31 21.1	12.765
17	10 30 51.25	1.8316	4 26 42.2	12.422	17	11 59 55.82	1.9071	5 44 6.7	12.756
18	10 32 41.14	1.8315	4 14 16.2	12.445	18	12 1 50.34	1.9104	5 56 51.7	12.744
19	10 34 31.03	1.8316	4 1 48.8	12.467	19	12 3 45.07	1.9139	6 9 36.0	12.732
20	10 36 20.93	1.8317	3 49 20.1	12.489	20	12 5 40.01	1.9174	6 22 19.5	12.718
21	10 38 10.83	1.8318	3 36 50.1	12.511	21	12 7 35.16	1.9210	6 35 2.2	12.704
22	10 40 0.74	1.8320	3 24 18.8	12.532	22	12 9 30.53	1.9247	6 47 44.0	12.689
23	10 41 50.67	1.8323	3 11 46.3	12.551	23	12 11 26.12	1.9283	7 0 24.9	12.674
24	10 43 40.62	1.8327	N. 2 59 12.7	12.569	24	12 13 21.93	1.9322	S. 7 13 4.9	12.657
MONDAY 2.					WEDNESDAY 4.				
0	10 45 30.59	1.8331	N. 2 46 38.0	12.587	0	12 15 17.98	1.9361	S. 7 25 43.8	12.639
1	10 47 20.59	1.8336	2 34 2.2	12.606	1	12 17 14.26	1.9400	7 38 21.6	12.621
2	10 49 10.62	1.8342	2 21 25.3	12.623	2	12 19 10.78	1.9441	7 50 58.3	12.602
3	10 51 0.69	1.8348	2 8 47.4	12.640	3	12 21 7.55	1.9483	8 3 33.8	12.582
4	10 52 50.79	1.8354	1 56 8.5	12.657	4	12 23 4.57	1.9524	8 16 8.1	12.561
5	10 54 40.94	1.8362	1 43 28.6	12.672	5	12 25 1.84	1.9567	8 28 41.1	12.538
6	10 56 31.13	1.8370	1 30 47.9	12.685	6	12 26 59.37	1.9610	8 41 12.7	12.515
7	10 58 21.38	1.8379	1 18 6.4	12.699	7	12 28 57.16	1.9654	8 53 42.9	12.492
8	11 0 11.68	1.8388	1 5 24.0	12.713	8	12 30 55.22	1.9699	9 6 11.7	12.467
9	11 2 2.04	1.8398	0 52 40.8	12.726	9	12 32 53.55	1.9745	9 18 38.9	12.440
10	11 3 52.46	1.8409	0 39 56.9	12.737	10	12 34 52.16	1.9792	9 31 4.5	12.413
11	11 5 42.95	1.8421	0 27 12.4	12.749	11	12 36 51.05	1.9839	9 43 28.5	12.386
12	11 7 33.51	1.8433	0 14 27.2	12.758	12	12 38 50.23	1.9888	9 55 50.8	12.357
13	11 9 24.15	1.8447	N. 0 1 41.4	12.767	13	12 40 49.70	1.9936	10 8 11.3	12.327
14	11 11 14.87	1.8460	S. 0 11 4.9	12.777	14	12 42 49.46	1.9985	10 20 30.0	12.296
15	11 13 5.67	1.8474	0 23 51.8	12.786	15	12 44 49.52	2.0036	10 32 46.8	12.263
16	11 14 56.56	1.8490	0 36 39.2	12.793	16	12 46 49.89	2.0088	10 45 1.6	12.231
17	11 16 47.55	1.8506	0 49 27.0	12.800	17	12 48 50.57	2.0139	10 57 14.5	12.197
18	11 18 38.63	1.8522	1 2 15.2	12.806	18	12 50 51.56	2.0191	11 9 25.2	12.161
19	11 20 29.81	1.8539	1 15 3.7	12.812	19	12 52 52.86	2.0244	11 21 33.8	12.125
20	11 22 21.10	1.8558	1 27 52.6	12.817	20	12 54 54.49	2.0299	11 33 40.2	12.087
21	11 24 12.50	1.8576	1 40 41.7	12.821	21	12 56 56.45	2.0353	11 45 44.3	12.049
22	11 26 4.01	1.8595	1 53 31.1	12.824	22	12 58 58.73	2.0408	11 57 46.1	12.010
23	11 27 55.64	1.8616	2 6 20.6	12.827	23	13 1 1.35	2.0464	12 9 45.5	11.969
24	11 29 47.40	1.8637	S. 2 19 10.3	12.829	24	13 3 4.30	2.0521	S. 12 21 42.4	11.927

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 5.					SATURDAY 7.				
0	h m s	"	S. 12 21 42.4	11.947	0	h m s	"	S. 20 41 13.2	8.329
1	13 3 4.30	2.0521	12 33 36.7	11.883	1	14 51 42.30	2.3999	20 49 29.6	8.217
2	13 7 11.25	2.0638	12 45 28.4	11.840	2	14 54 6.53	2.4078	20 57 39.3	8.103
3	13 9 15.26	2.0698	12 57 17.5	11.795	3	14 56 31.23	2.4156	21 5 42.0	7.987
4	13 11 19.62	2.0757	13 9 3.8	11.747	4	14 58 56.40	2.4234	21 13 37.8	7.870
5	13 13 24.34	2.0818	13 20 47.2	11.699	5	15 1 22.04	2.4312	21 21 26.4	7.750
6	13 15 29.43	2.0878	13 32 27.7	11.651	6	15 3 48.14	2.4389	21 29 7.8	7.630
7	13 17 34.88	2.0940	13 44 5.3	11.601	7	15 6 14.71	2.4468	21 36 42.0	7.507
8	13 19 40.71	2.1003	13 55 39.8	11.549	8	15 8 41.75	2.4545	21 44 8.7	7.382
9	13 21 46.92	2.1066	14 7 11.2	11.497	9	15 11 9.25	2.4622	21 51 27.9	7.257
10	13 23 53.50	2.1129	14 18 39.4	11.443	10	15 13 37.21	2.4698	21 58 39.6	7.130
11	13 26 0.47	2.1194	14 30 4.3	11.387	11	15 16 5.63	2.4774	22 5 43.5	7.001
12	13 28 7.83	2.1259	14 41 25.8	11.330	12	15 18 34.50	2.4850	22 12 39.7	6.871
13	13 30 15.58	2.1325	14 52 43.9	11.272	13	15 21 3.83	2.4927	22 19 28.0	6.737
14	13 32 23.73	2.1392	15 3 58.5	11.213	14	15 23 33.62	2.5003	22 26 8.2	6.603
15	13 34 32.28	2.1459	15 15 9.5	11.154	15	15 26 3.86	2.5077	22 32 40.4	6.467
16	13 36 41.24	2.1527	15 26 16.8	11.091	16	15 28 34.54	2.5151	22 39 4.3	6.330
17	13 38 50.60	2.1594	15 37 20.4	11.027	17	15 31 5.67	2.5225	22 45 20.0	6.191
18	13 41 0.37	2.1663	15 48 20.1	10.963	18	15 33 37.24	2.5298	22 51 27.2	6.050
19	13 43 10.56	2.1733	15 59 16.0	10.897	19	15 36 9.24	2.5370	22 57 26.0	5.908
20	13 45 21.16	2.1802	16 10 7.8	10.829	20	15 38 41.68	2.5442	23 3 16.2	5.764
21	13 47 32.18	2.1873	16 20 55.5	10.761	21	15 41 14.55	2.5513	23 8 57.7	5.618
22	13 49 43.63	2.1944	16 31 39.1	10.691	22	15 43 47.84	2.5583	23 14 30.4	5.472
23	13 51 55.51	2.2016	S. 16 42 18.4	10.618	23	15 46 21.55	2.5653	S. 23 19 54.3	5.323
FRIDAY 6.					SUNDAY 8.				
0	13 54 7.82	2.2088	S. 16 52 53.3	10.545	0	15 48 55.68	2.5723	S. 23 25 9.2	5.173
1	13 56 20.56	2.2160	17 3 23.8	10.471	1	15 51 30.22	2.5791	23 30 15.1	5.022
2	13 58 33.74	2.2233	17 13 49.8	10.395	2	15 54 5.17	2.5858	23 35 11.8	4.868
3	14 0 47.35	2.2306	17 24 11.2	10.317	3	15 56 40.52	2.5924	23 39 59.3	4.714
4	14 3 1.41	2.2380	17 34 27.9	10.238	4	15 59 16.26	2.5989	23 44 37.5	4.557
5	14 5 15.91	2.2454	17 44 39.8	10.157	5	16 1 52.39	2.6054	23 49 6.2	4.400
6	14 7 30.86	2.2529	17 54 46.8	10.076	6	16 4 28.91	2.6118	23 53 25.5	4.242
7	14 9 46.26	2.2604	18 4 48.9	9.993	7	16 7 5.81	2.6180	23 57 35.2	4.081
8	14 12 2.11	2.2679	18 14 45.9	9.907	8	16 9 43.07	2.6241	24 1 35.2	3.919
9	14 14 18.41	2.2755	18 24 37.7	9.821	9	16 12 20.70	2.6302	24 5 25.5	3.757
10	14 16 35.17	2.2831	18 34 24.4	9.733	10	16 14 58.69	2.6361	24 9 6.0	3.592
11	14 18 52.39	2.2908	18 44 5.7	9.643	11	16 17 37.03	2.6418	24 12 36.5	3.426
12	14 21 10.07	2.2985	18 53 41.6	9.552	12	16 20 15.71	2.6475	24 15 57.1	3.259
13	14 23 28.21	2.3062	19 3 11.9	9.458	13	16 22 54.73	2.6530	24 19 7.6	3.091
14	14 25 46.81	2.3139	19 12 36.6	9.364	14	16 25 34.07	2.6584	24 22 8.0	2.921
15	14 28 5.88	2.3217	19 21 55.6	9.268	15	16 28 13.74	2.6637	24 24 58.1	2.750
16	14 30 25.41	2.3294	19 31 8.8	9.171	16	16 30 53.72	2.6688	24 27 38.0	2.577
17	14 32 45.41	2.3373	19 40 16.1	9.071	17	16 33 34.00	2.6738	24 30 7.5	2.405
18	14 35 5.88	2.3450	19 49 17.3	8.970	18	16 36 14.58	2.6788	24 32 26.6	2.232
19	14 37 26.81	2.3528	19 58 12.5	8.867	19	16 38 55.45	2.6834	24 34 35.3	2.057
20	14 39 48.22	2.3607	20 7 1.4	8.763	20	16 41 36.59	2.6879	24 36 33.4	1.880
21	14 42 10.10	2.3685	20 15 44.1	8.657	21	16 44 18.00	2.6924	24 38 20.9	1.703
22	14 44 32.44	2.3763	20 24 20.3	8.550	22	16 46 59.68	2.6967	24 39 57.8	1.525
23	14 46 55.26	2.3842	20 32 50.1	8.441	23	16 49 41.61	2.7008	24 41 23.9	1.346
24	14 49 18.54	2.3920	S. 20 41 13.2	8.329	24	16 52 23.78	2.7048	S. 24 42 39.3	1.166

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 9.					WEDNESDAY 11.				
0	16 52 23.78	2.7048	S. 24 42 39.3	1.166	0	19 3 31.83	2.6934	S. 22 5 8.6	7.624
1	16 55 6.19	2.7087	24 43 43.8	0.984	1	19 6 13.31	2.6893	21 57 26.1	7.791
2	16 57 48.82	2.7123	24 44 37.4	0.802	2	19 8 54.54	2.6850	21 49 33.7	7.956
3	17 0 31.66	2.7158	24 45 20.1	0.621	3	19 11 35.51	2.6806	21 41 31.4	8.120
4	17 3 14.71	2.7191	24 45 51.9	0.438	4	19 14 16.21	2.6760	21 33 19.3	8.282
5	17 5 57.95	2.7223	24 46 12.6	0.253	5	19 16 56.63	2.6714	21 24 57.6	8.442
6	17 8 41.38	2.7253	24 46 22.3	-0.069	6	19 19 36.78	2.6658	21 16 26.2	8.602
7	17 11 24.98	2.7280	24 46 20.9	+0.117	7	19 22 16.65	2.6620	21 7 45.3	8.761
8	17 14 8.74	2.7307	24 46 8.3	0.302	8	19 24 56.22	2.6570	20 58 54.9	8.917
9	17 16 52.66	2.7332	24 45 44.6	0.487	9	19 27 35.49	2.6520	20 49 55.3	9.071
10	17 19 36.72	2.7354	24 45 9.8	0.674	10	19 30 14.46	2.6469	20 40 46.4	9.224
11	17 22 20.91	2.7375	24 44 23.7	0.862	11	19 32 53.12	2.6417	20 31 28.4	9.375
12	17 25 5.22	2.7394	24 43 26.4	1.049	12	19 35 31.46	2.6363	20 22 1.4	9.524
13	17 27 49.64	2.7412	24 42 17.8	1.237	13	19 38 9.48	2.6310	20 12 25.5	9.672
14	17 30 34.17	2.7428	24 40 58.0	1.424	14	19 40 47.18	2.6255	20 2 40.8	9.818
15	17 33 18.78	2.7442	24 39 26.9	1.612	15	19 43 24.54	2.6199	19 52 47.3	9.962
16	17 36 3.47	2.7454	24 37 44.5	1.801	16	19 46 1.57	2.6143	19 42 45.3	10.104
17	17 38 48.23	2.7465	24 35 50.8	1.989	17	19 48 38.26	2.6087	19 32 34.8	10.245
18	17 41 33.05	2.7473	24 33 45.8	2.177	18	19 51 14.61	2.6029	19 22 15.9	10.383
19	17 44 17.91	2.7480	24 31 29.5	2.367	19	19 53 50.61	2.5971	19 11 48.8	10.520
20	17 47 2.81	2.7485	24 29 1.8	2.555	20	19 56 26.26	2.5912	19 1 13.5	10.655
21	17 49 47.73	2.7488	24 26 22.9	2.743	21	19 59 1.56	2.5853	18 50 30.2	10.787
22	17 52 32.67	2.7490	24 23 32.7	2.931	22	20 1 36.50	2.5793	18 39 39.0	10.919
23	17 55 17.61	2.7490	S. 24 20 31.2	3.120	23	20 4 11.08	2.5733	S. 18 28 39.9	11.048
TUESDAY 10.					THURSDAY 12.				
0	17 58 2.55	2.7497	S. 24 17 18.3	3.308	0	20 6 45.30	2.5672	S. 18 17 33.2	11.174
1	18 0 47.46	2.7493	24 13 54.2	3.496	1	20 9 19.15	2.5611	18 6 19.0	11.293
2	18 3 32.34	2.7478	24 10 18.8	3.683	2	20 11 52.63	2.5549	17 54 57.3	11.422
3	18 6 17.19	2.7471	24 6 32.2	3.869	3	20 14 25.74	2.5487	17 43 28.3	11.543
4	18 9 1.99	2.7461	24 2 34.5	4.056	4	20 16 58.48	2.5426	17 31 52.1	11.662
5	18 11 46.72	2.7449	23 58 25.5	4.242	5	20 19 30.85	2.5363	17 20 8.8	11.779
6	18 14 31.38	2.7437	23 54 5.4	4.427	6	20 22 2.84	2.5301	17 8 18.6	11.893
7	18 17 15.96	2.7422	23 49 34.2	4.612	7	20 24 34.46	2.5237	16 56 21.6	12.007
8	18 20 0.45	2.7406	23 44 51.9	4.797	8	20 27 5.69	2.5174	16 44 17.8	12.117
9	18 22 44.83	2.7388	23 39 58.5	4.981	9	20 29 36.55	2.5112	16 32 7.5	12.225
10	18 25 29.11	2.7369	23 34 54.2	5.163	10	20 32 7.03	2.5048	16 19 50.8	12.332
11	18 28 13.26	2.7347	23 29 38.9	5.345	11	20 34 37.13	2.4985	16 7 27.7	12.437
12	18 30 57.27	2.7324	23 24 12.8	5.527	12	20 37 6.85	2.4922	15 54 58.4	12.538
13	18 33 41.15	2.7300	23 18 35.7	5.708	13	20 39 36.19	2.4858	15 42 23.1	12.638
14	18 36 24.87	2.7273	23 12 47.8	5.887	14	20 42 5.14	2.4794	15 29 41.8	12.737
15	18 39 8.43	2.7246	23 6 49.2	6.066	15	20 44 33.72	2.4731	15 16 54.7	12.833
16	18 41 51.82	2.7217	23 0 39.9	6.243	16	20 47 1.91	2.4667	15 4 1.9	12.927
17	18 44 35.04	2.7187	22 54 20.0	6.420	17	20 49 29.73	2.4604	14 51 3.5	13.018
18	18 47 18.07	2.7155	22 47 49.5	6.596	18	20 51 57.16	2.4541	14 37 59.7	13.108
19	18 50 0.90	2.7122	22 41 8.5	6.770	19	20 54 24.22	2.4477	14 24 50.5	13.196
20	18 52 43.53	2.7087	22 34 17.1	6.943	20	20 56 50.89	2.4414	14 11 36.2	13.281
21	18 55 25.94	2.7051	22 27 15.3	7.116	21	20 59 17.19	2.4352	13 58 16.8	13.364
22	18 58 8.14	2.7013	22 20 3.2	7.286	22	21 1 43.11	2.4289	13 44 52.5	13.445
23	19 0 50.10	2.6974	22 12 41.0	7.455	23	21 4 8.66	2.4227	13 31 23.4	13.524
24	19 3 31.83	2.6934	S. 22 5 8.6	7.624	24	21 6 33.83	2.4164	S. 13 17 49.6	13.602

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					SUNDAY 15.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	21 6 33.83	2.4164	S. 13 17 49.6	13.602	1	22 56 15.84	2.1775	S. 1 33 54.6	15.026
2	21 8 58.63	2.4102	13 4 11.2	13.676	2	22 58 26.39	2.1742	1 18 53.4	15.014
3	21 11 23.05	2.4040	12 50 28.5	13.748	3	23 0 36.75	2.1711	1 3 52.9	15.001
4	21 13 47.11	2.3980	12 36 41.4	13.820	4	23 2 46.92	2.1678	0 48 53.3	14.986
5	21 16 10.81	2.3919	12 22 50.1	13.888	5	23 4 56.89	2.1647	0 33 54.6	14.969
6	21 18 34.14	2.3858	12 8 54.8	13.955	6	23 7 6.68	2.1617	0 18 57.0	14.951
7	21 20 57.10	2.3798	11 54 55.5	14.020	7	23 9 16.29	2.1587	S. 0 4 0.5	14.932
8	21 23 19.71	2.3738	11 40 52.4	14.082	8	23 11 25.72	2.1557	N. 0 10 54.8	14.912
9	21 25 41.96	2.3678	11 26 45.7	14.142	9	23 13 34.98	2.1529	0 25 48.9	14.890
10	21 28 3.85	2.3619	11 12 35.4	14.201	10	23 15 44.07	2.1502	0 40 41.6	14.866
11	21 30 25.39	2.3561	10 58 21.6	14.257	11	23 17 53.00	2.1475	0 55 32.8	14.841
12	21 32 46.58	2.3503	10 44 4.5	14.312	12	23 20 1.77	2.1448	1 10 22.5	14.815
13	21 35 7.42	2.3445	10 29 44.2	14.364	13	23 22 10.38	2.1422	1 25 10.6	14.788
14	21 37 27.92	2.3387	10 15 20.8	14.414	14	23 24 18.84	2.1398	1 39 57.0	14.759
15	21 39 48.07	2.3331	10 0 54.5	14.462	15	23 26 27.16	2.1373	1 54 41.7	14.730
16	21 42 7.89	2.3275	9 46 25.3	14.509	16	23 28 35.34	2.1352	2 9 24.6	14.698
17	21 44 27.37	2.3219	9 31 53.4	14.553	17	23 30 43.38	2.1329	2 24 5.5	14.666
18	21 46 46.52	2.3164	9 17 18.9	14.596	18	23 32 51.29	2.1307	2 38 44.5	14.632
19	21 49 5.34	2.3110	9 2 41.9	14.637	19	23 34 59.07	2.1286	2 53 21.4	14.597
20	21 51 23.84	2.3057	8 48 2.5	14.676	20	23 37 6.72	2.1265	3 7 56.2	14.562
21	21 53 42.02	2.3003	8 33 20.8	14.712	21	23 39 14.25	2.1246	3 22 28.8	14.524
22	21 55 59.88	2.2950	8 18 37.0	14.747	22	23 41 21.67	2.1227	3 36 59.1	14.485
23	21 58 17.42	2.2897	8 3 51.1	14.780	23	23 43 28.98	2.1209	3 51 27.0	14.446
24	22 0 34.65	2.2846	S. 7 49 3.4	14.811	24	23 45 36.18	2.1191	N. 4 5 52.6	14.406
SATURDAY 14.					MONDAY 16.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	22 2 51.57	2.2795	S. 7 34 13.8	14.841	1	23 47 43.27	2.1174	N. 4 20 15.7	14.363
2	22 5 8.19	2.2745	7 19 22.5	14.868	2	23 49 50.27	2.1158	4 34 36.2	14.320
3	22 7 24.51	2.2695	7 4 29.7	14.893	3	23 51 57.17	2.1142	4 48 54.1	14.277
4	22 9 40.53	2.2646	6 49 35.3	14.917	4	23 54 3.98	2.1127	5 3 9.4	14.232
5	22 11 56.26	2.2598	6 34 39.6	14.939	5	23 56 10.70	2.1113	5 17 21.9	14.184
6	22 14 11.71	2.2551	6 19 42.6	14.959	6	23 58 17.34	2.1100	5 31 31.5	14.137
7	22 16 26.87	2.2503	6 4 44.5	14.977	7	0 0 23.90	2.1087	5 45 38.3	14.088
8	22 18 41.75	2.2457	5 49 45.3	14.995	8	0 2 30.39	2.1075	5 59 42.1	14.038
9	22 20 56.35	2.2411	5 34 45.1	15.010	9	0 4 36.80	2.1063	6 13 42.9	13.988
10	22 23 10.68	2.2366	5 19 44.1	15.023	10	0 6 43.15	2.1052	6 27 40.7	13.937
11	22 25 24.74	2.2321	5 4 42.3	15.035	11	0 8 49.43	2.1042	6 41 35.3	13.883
12	22 27 38.53	2.2277	4 49 39.9	15.045	12	0 10 55.66	2.1033	6 55 26.7	13.829
13	22 29 52.07	2.2235	4 34 36.9	15.053	13	0 13 1.83	2.1024	7 9 14.8	13.774
14	22 32 5.35	2.2193	4 19 33.5	15.059	14	0 15 7.95	2.1016	7 22 59.6	13.719
15	22 34 18.39	2.2152	4 4 29.8	15.064	15	0 17 14.02	2.1008	7 36 41.1	13.662
16	22 36 31.17	2.2110	3 49 25.8	15.067	16	0 19 20.05	2.1002	7 50 19.1	13.604
17	22 38 43.71	2.2071	3 34 21.7	15.069	17	0 21 26.04	2.0995	8 3 53.6	13.546
18	22 40 56.02	2.2032	3 19 17.5	15.070	18	0 23 31.99	2.0989	8 17 24.6	13.487
19	22 43 8.09	2.1993	3 4 13.3	15.068	19	0 25 37.91	2.0984	8 30 52.0	13.426
20	22 45 19.93	2.1955	2 49 9.3	15.065	20	0 27 43.80	2.0980	8 44 15.7	13.364
21	22 47 31.55	2.1917	2 34 5.5	15.060	21	0 29 49.67	2.0976	8 57 35.7	13.302
22	22 49 42.94	2.1881	2 19 2.1	15.054	22	0 31 55.51	2.0972	9 10 51.9	13.238
23	22 51 54.12	2.1846	2 3 59.0	15.047	23	0 34 1.33	2.0969	9 24 4.2	13.173
24	22 54 5.09	2.1810	1 48 56.5	15.037	24	0 36 7.14	2.0967	9 37 12.7	13.108
			S. 1 33 54.6	15.026		0 38 12.93	2.0964	N. 9 50 17.2	13.042

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 17.					THURSDAY 19.				
0	h m s		N. ° ' "		0	h m s		N. ° ' "	
0	38 12.93	2.0964	N. 9 50 17.2	13.042	0	2 19 31.04	2.1377	N. 18 45 5.9	8.969
1	0 40 18.71	2.0963	10 3 17.7	12.975	1	2 21 39.35	2.1392	18 54 1.0	8.868
2	0 42 24.49	2.0963	10 16 14.2	12.907	2	2 23 47.74	2.1407	19 2 50.1	8.767
3	0 44 30.27	2.0963	10 29 6.6	12.839	3	2 25 56.23	2.1422	19 11 33.1	8.665
4	0 46 36.05	2.0963	10 41 54.9	12.769	4	2 28 4.80	2.1437	19 20 9.9	8.562
5	0 48 41.83	2.0964	10 54 38.9	12.698	5	2 30 13.47	2.1452	19 28 40.6	8.460
6	0 50 47.62	2.0966	11 7 18.7	12.627	6	2 32 22.23	2.1467	19 37 5.1	8.356
7	0 52 53.42	2.0968	11 19 54.2	12.556	7	2 34 31.08	2.1483	19 45 23.3	8.252
8	0 54 59.24	2.0971	11 32 25.4	12.483	8	2 36 40.03	2.1498	19 53 35.3	8.147
9	0 57 5.07	2.0973	11 44 52.1	12.408	9	2 38 49.06	2.1513	20 1 40.9	8.042
10	0 59 10.92	2.0977	11 57 14.4	12.334	10	2 40 58.19	2.1529	20 9 40.3	7.937
11	1 1 16.79	2.0981	12 9 32.2	12.259	11	2 43 7.41	2.1544	20 17 33.3	7.829
12	1 3 22.69	2.0985	12 21 45.5	12.183	12	2 45 16.72	2.1559	20 25 19.8	7.722
13	1 5 28.61	2.0990	12 33 54.2	12.106	13	2 47 26.12	2.1575	20 33 0.0	7.616
14	1 7 34.57	2.0996	12 45 58.2	12.027	14	2 49 35.62	2.1590	20 40 33.7	7.508
15	1 9 40.56	2.1001	12 57 57.5	11.949	15	2 51 45.20	2.1605	20 48 1.0	7.400
16	1 11 46.58	2.1007	13 9 52.1	11.871	16	2 53 54.88	2.1620	20 55 21.7	7.292
17	1 13 52.64	2.1013	13 21 42.0	11.791	17	2 56 4.64	2.1635	21 2 36.0	7.183
18	1 15 58.74	2.1021	13 33 27.0	11.709	18	2 58 14.50	2.1650	21 9 43.7	7.073
19	1 18 4.89	2.1028	13 45 7.1	11.627	19	3 0 24.44	2.1664	21 16 44.8	6.963
20	1 20 11.08	2.1036	13 56 42.3	11.546	20	3 2 34.47	2.1678	21 23 39.3	6.852
21	1 22 17.32	2.1044	14 8 12.6	11.463	21	3 4 44.58	2.1692	21 30 27.1	6.742
22	1 24 23.61	2.1053	14 19 37.9	11.379	22	3 6 54.78	2.1707	21 37 8.3	6.632
23	1 26 29.96	2.1062	N. 14 30 58.1	11.294	23	3 9 5.07	2.1722	N. 21 43 42.9	6.520
WEDNESDAY 18.					FRIDAY 20.				
0	h m s		N. ° ' "		0	h m s		N. ° ' "	
0	1 28 36.36	2.1072	N. 14 42 13.2	11.209	0	3 11 15.44	2.1736	N. 21 50 10.7	6.407
1	1 30 42.82	2.1081	14 53 23.2	11.123	1	3 13 25.90	2.1749	21 56 31.8	6.296
2	1 32 49.33	2.1091	15 4 28.0	11.037	2	3 15 36.43	2.1763	22 2 46.2	6.183
3	1 34 55.91	2.1102	15 15 27.6	10.950	3	3 17 47.05	2.1777	22 8 53.7	6.069
4	1 37 2.55	2.1112	15 26 22.0	10.862	4	3 19 57.75	2.1789	22 14 54.5	5.956
5	1 39 9.25	2.1122	15 37 11.1	10.773	5	3 22 8.52	2.1802	22 20 48.4	5.842
6	1 41 16.02	2.1134	15 47 54.8	10.684	6	3 24 19.37	2.1815	22 26 35.5	5.728
7	1 43 22.86	2.1146	15 58 33.2	10.595	7	3 26 30.30	2.1828	22 32 15.8	5.613
8	1 45 29.77	2.1158	16 9 6.2	10.504	8	3 28 41.31	2.1840	22 37 49.1	5.498
9	1 47 36.76	2.1171	16 19 33.7	10.412	9	3 30 52.38	2.1851	22 43 15.6	5.383
10	1 49 43.82	2.1183	16 29 55.7	10.320	10	3 33 3.52	2.1863	22 48 35.1	5.267
11	1 51 50.95	2.1195	16 40 12.1	10.227	11	3 35 14.74	2.1875	22 53 47.7	5.152
12	1 53 58.16	2.1207	16 50 23.0	10.135	12	3 37 26.02	2.1886	22 58 53.3	5.035
13	1 56 5.44	2.1221	17 0 28.3	10.042	13	3 39 37.37	2.1897	23 3 51.9	4.919
14	1 58 12.81	2.1234	17 10 28.0	9.947	14	3 41 48.78	2.1907	23 8 43.6	4.802
15	2 0 20.25	2.1247	17 20 21.9	9.852	15	3 44 0.25	2.1917	23 13 28.2	4.685
16	2 2 27.78	2.1261	17 30 10.2	9.757	16	3 46 11.78	2.1927	23 18 5.8	4.567
17	2 4 35.38	2.1274	17 39 52.7	9.660	17	3 48 23.37	2.1936	23 22 36.3	4.450
18	2 6 43.07	2.1289	17 49 29.4	9.563	18	3 50 35.01	2.1945	23 26 59.8	4.332
19	2 8 50.85	2.1304	17 59 0.3	9.466	19	3 52 46.71	2.1953	23 31 16.2	4.214
20	2 10 58.72	2.1318	18 8 25.3	9.367	20	3 54 58.45	2.1962	23 35 25.5	4.096
21	2 13 6.67	2.1332	18 17 44.4	9.269	21	3 57 10.25	2.1970	23 39 27.7	3.977
22	2 15 14.70	2.1347	18 26 57.6	9.169	22	3 59 22.09	2.1977	23 43 22.8	3.858
23	2 17 22.83	2.1362	18 36 4.7	9.069	23	4 1 33.97	2.1985	23 47 10.7	3.739
24	2 19 31.04	2.1377	N. 18 45 5.9	8.969	24	4 3 45.89	2.1991	N. 23 50 51.5	3.621

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 21.					MONDAY 23.				
0	h m s		N. 23 50 51.5	3.621	0	h m s		N. 24 26 13.0	2.119
1	4 5 57.86	2.1997	23 54 25.2	3.502	1	5 51 21.19	2.1717	24 24 2.4	2.285
2	4 8 9.86	2.2003	23 57 51.7	3.382	2	5 53 31.44	2.1698	24 21 44.8	2.350
3	4 10 21.89	2.2008	24 1 11.0	3.262	3	5 55 41.57	2.1679	24 19 20.4	2.464
4	4 12 33.96	2.2013	24 4 23.1	3.142	4	5 57 51.59	2.1659	24 16 49.1	2.579
5	4 14 46.05	2.2017	24 7 28.0	3.022	5	6 0 1.48	2.1639	24 14 10.9	2.693
6	4 16 58.17	2.2022	24 10 25.8	2.902	6	6 2 11.26	2.1620	24 11 25.9	2.807
7	4 19 10.32	2.2027	24 13 16.3	2.782	7	6 4 20.92	2.1599	24 8 34.0	2.921
8	4 21 22.49	2.2029	24 15 59.6	2.662	8	6 6 30.45	2.1577	24 5 35.4	3.033
9	4 23 34.67	2.2031	24 18 35.7	2.541	9	6 8 39.85	2.1556	24 2 30.0	3.146
10	4 25 46.86	2.2033	24 21 4.5	2.420	10	6 10 49.12	2.1533	23 59 17.9	3.258
11	4 27 59.07	2.2036	24 23 26.1	2.300	11	6 12 58.25	2.1511	23 55 59.0	3.370
12	4 30 11.29	2.2037	24 25 40.5	2.179	12	6 15 7.25	2.1488	23 52 33.5	3.481
13	4 32 23.51	2.2037	24 27 47.6	2.058	13	6 17 16.11	2.1465	23 49 1.3	3.592
14	4 34 35.74	2.2038	24 29 47.5	1.937	14	6 19 24.83	2.1442	23 45 22.5	3.702
15	4 36 47.97	2.2037	24 31 40.1	1.817	15	6 21 33.41	2.1417	23 41 37.1	3.812
16	4 39 0.19	2.2036	24 33 25.5	1.696	16	6 23 41.84	2.1392	23 37 45.0	3.922
17	4 41 12.40	2.2035	24 35 3.6	1.575	17	6 25 50.12	2.1368	23 33 46.4	4.030
18	4 43 24.61	2.2034	24 36 34.5	1.454	18	6 27 58.26	2.1343	23 29 41.4	4.138
19	4 45 36.81	2.2032	24 37 58.1	1.333	19	6 30 6.24	2.1317	23 25 29.8	4.247
20	4 47 48.99	2.2028	24 39 14.5	1.213	20	6 32 14.06	2.1291	23 21 11.7	4.355
21	4 50 1.15	2.2025	24 40 23.7	1.092	21	6 34 21.73	2.1265	23 16 47.2	4.462
22	4 52 13.29	2.2021	24 41 25.6	0.971	22	6 36 29.24	2.1238	23 12 16.3	4.568
23	4 54 25.40	2.2017	N. 24 42 20.2	0.851	23	6 38 36.59	2.1212	N. 23 7 39.0	4.674
SUNDAY 22.					TUESDAY 24.				
0	4 56 37.49	2.2012	N. 24 43 7.7	0.731	0	6 40 43.78	2.1184	N. 23 2 55.4	4.779
1	4 58 49.55	2.2007	24 43 47.9	0.609	1	6 42 50.80	2.1157	22 58 5.5	4.884
2	5 1 1.57	2.2000	24 44 20.8	0.488	2	6 44 57.66	2.1129	22 53 9.3	4.988
3	5 3 13.55	2.1993	24 44 46.5	0.368	3	6 47 4.35	2.1101	22 48 6.9	5.092
4	5 5 25.49	2.1987	24 45 5.0	0.248	4	6 49 10.87	2.1072	22 42 58.3	5.195
5	5 7 37.39	2.1979	24 45 16.3	0.128	5	6 51 17.22	2.1044	22 37 43.5	5.297
6	5 9 49.24	2.1971	24 45 20.4	+0.007	6	6 53 23.40	2.1015	22 32 22.6	5.400
7	5 12 1.04	2.1962	24 45 17.2	-0.112	7	6 55 29.40	2.0985	22 26 55.5	5.502
8	5 14 12.78	2.1952	24 45 6.9	0.232	8	6 57 35.22	2.0956	22 21 22.4	5.602
9	5 16 24.47	2.1943	24 44 49.4	0.352	9	6 59 40.87	2.0927	22 15 43.2	5.702
10	5 18 36.10	2.1933	24 44 24.7	0.471	10	7 1 46.34	2.0897	22 9 58.1	5.802
11	5 20 47.67	2.1922	24 43 52.9	0.590	11	7 3 51.63	2.0867	22 4 7.0	5.901
12	5 22 59.17	2.1911	24 43 13.9	0.710	12	7 5 56.75	2.0837	21 58 10.0	5.999
13	5 25 10.60	2.1899	24 42 27.7	0.829	13	7 8 1.68	2.0807	21 52 7.1	6.097
14	5 27 21.96	2.1887	24 41 34.4	0.947	14	7 10 6.43	2.0776	21 45 58.4	6.194
15	5 29 33.24	2.1873	24 40 34.0	1.066	15	7 12 10.99	2.0745	21 39 43.8	6.291
16	5 31 44.44	2.1860	24 39 26.5	1.183	16	7 14 15.37	2.0714	21 33 23.5	6.386
17	5 33 55.56	2.1847	24 38 12.0	1.301	17	7 16 19.56	2.0682	21 26 57.5	6.482
18	5 36 6.60	2.1832	24 36 50.4	1.419	18	7 18 23.56	2.0652	21 20 25.7	6.577
19	5 38 17.54	2.1817	24 35 21.7	1.537	19	7 20 27.38	2.0621	21 13 48.3	6.670
20	5 40 28.40	2.1802	24 33 46.0	1.654	20	7 22 31.01	2.0589	21 7 5.3	6.763
21	5 42 39.16	2.1785	24 32 3.2	1.771	21	7 24 34.45	2.0557	21 0 16.7	6.857
22	5 44 49.82	2.1768	24 30 13.5	1.887	22	7 26 37.70	2.0526	20 53 22.5	6.949
23	5 47 0.38	2.1752	24 28 16.7	2.004	23	7 28 40.76	2.0494	20 46 22.8	7.040
24	5 49 10.84	2.1734	N. 24 26 13.0	2.119	24	7 30 43.63	2.0462	N. 20 39 17.7	7.130

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 25.					FRIDAY 27.				
0	h m s		N. ° ' "	"	0	h m s		N. ° ' "	"
1	7 30 43.63	2.0462	20 39 17.7	7.130	1	9 5 22.87	1.9037	13 26 4.3	10.641
2	7 32 46.31	2.0431	20 32 7.2	7.220	2	9 7 17.02	1.9013	13 15 24.2	10.696
3	7 34 48.80	2.0399	20 24 51.3	7.309	3	9 9 11.03	1.8990	13 4 40.8	10.751
4	7 36 51.10	2.0367	20 17 30.1	7.397	4	9 11 4.90	1.8967	12 53 54.1	10.804
5	7 38 53.20	2.0334	20 10 3.6	7.486	5	9 12 58.63	1.8943	12 43 4.3	10.857
6	7 40 55.11	2.0302	20 2 31.8	7.573	6	9 14 52.22	1.8921	12 32 11.3	10.909
7	7 42 56.83	2.0271	19 54 54.8	7.660	7	9 16 45.68	1.8898	12 21 15.2	10.960
8	7 44 58.36	2.0239	19 47 12.6	7.746	8	9 18 39.00	1.8876	12 10 16.1	11.011
9	7 46 59.70	2.0207	19 39 25.3	7.830	9	9 20 32.19	1.8855	11 59 13.9	11.061
10	7 49 0.85	2.0175	19 31 33.0	7.914	10	9 22 25.26	1.8834	11 48 8.8	11.110
11	7 51 1.80	2.0148	19 23 35.6	7.999	11	9 24 18.20	1.8812	11 37 0.7	11.159
12	7 53 2.56	2.0111	19 15 33.1	8.082	12	9 26 11.01	1.8791	11 25 49.7	11.207
13	7 55 3.13	2.0079	19 7 25.8	8.163	13	9 28 3.71	1.8773	11 14 35.9	11.253
14	7 57 3.51	2.0047	18 59 13.5	8.246	14	9 29 56.29	1.8753	11 3 19.3	11.300
15	7 59 3.70	2.0015	18 50 56.3	8.327	15	9 31 48.75	1.8733	10 51 59.9	11.346
16	8 1 3.69	1.9983	18 42 34.3	8.407	16	9 33 41.09	1.8714	10 40 37.8	11.390
17	8 3 3.50	1.9952	18 34 7.5	8.487	17	9 35 33.32	1.8696	10 29 13.1	11.434
18	8 5 3.12	1.9921	18 25 35.9	8.565	18	9 37 25.44	1.8678	10 17 45.7	11.477
19	8 7 2.55	1.9890	18 16 59.7	8.643	19	9 39 17.46	1.8662	10 6 15.8	11.520
20	8 9 1.80	1.9858	18 8 18.8	8.721	20	9 41 9.38	1.8644	9 54 43.3	11.562
21	8 11 0.85	1.9827	17 59 33.2	8.797	21	9 43 1.19	1.8627	9 43 8.3	11.603
22	8 12 59.72	1.9797	17 50 43.1	8.872	22	9 44 52.91	1.8612	9 31 30.9	11.643
23	8 14 58.41	1.9766	17 41 48.5	8.947	23	9 46 44.54	1.8597	9 19 51.1	11.683
24	8 16 56.91	1.9735	N. 17 32 49.4	9.022	24	9 48 36.07	1.8581	N. 9 8 8.9	11.722
THURSDAY 26.					SATURDAY 28.				
0	8 18 55.23	1.9705	N. 17 23 45.9	9.095	0	9 50 27.51	1.8566	N. 8 56 24.4	11.761
1	8 20 53.37	1.9674	17 14 38.0	9.168	1	9 52 18.86	1.8552	8 44 37.6	11.798
2	8 22 51.32	1.9643	17 5 25.7	9.241	2	9 54 10.14	1.8539	8 32 48.6	11.835
3	8 24 49.09	1.9613	16 56 9.1	9.312	3	9 56 1.33	1.8525	8 20 57.4	11.871
4	8 26 46.68	1.9583	16 46 48.2	9.382	4	9 57 52.44	1.8512	8 9 4.1	11.906
5	8 28 44.09	1.9554	16 37 23.2	9.452	5	9 59 43.47	1.8500	7 57 8.7	11.941
6	8 30 41.33	1.9525	16 27 54.0	9.522	6	10 1 34.44	1.8488	7 45 11.2	11.975
7	8 32 38.39	1.9495	16 18 20.6	9.591	7	10 3 25.33	1.8477	7 33 11.7	12.008
8	8 34 35.27	1.9467	16 8 43.1	9.658	8	10 5 16.16	1.8466	7 21 10.2	12.041
9	8 36 31.99	1.9438	15 59 1.6	9.725	9	10 7 6.92	1.8456	7 9 6.8	12.072
10	8 38 28.53	1.9408	15 49 16.1	9.792	10	10 8 57.63	1.8447	6 57 1.5	12.103
11	8 40 24.89	1.9380	15 39 26.6	9.857	11	10 10 48.28	1.8437	6 44 54.4	12.133
12	8 42 21.09	1.9352	15 29 33.3	9.921	12	10 12 38.87	1.8428	6 32 45.5	12.162
13	8 44 17.12	1.9325	15 19 36.1	9.986	13	10 14 29.41	1.8420	6 20 34.9	12.192
14	8 46 12.99	1.9297	15 9 35.0	10.049	14	10 16 19.91	1.8412	6 8 22.5	12.220
15	8 48 8.69	1.9269	14 59 30.2	10.112	15	10 18 10.36	1.8404	5 56 8.5	12.247
16	8 50 4.22	1.9242	14 49 21.6	10.175	16	10 20 0.76	1.8397	5 43 52.9	12.274
17	8 51 59.60	1.9217	14 39 9.4	10.234	17	10 21 51.13	1.8392	5 31 35.6	12.300
18	8 53 54.82	1.9190	14 28 53.5	10.295	18	10 23 41.47	1.8387	5 19 16.9	12.324
19	8 55 49.88	1.9163	14 18 34.0	10.354	19	10 25 31.77	1.8381	5 6 56.7	12.349
20	8 57 44.78	1.9137	14 8 11.0	10.412	20	10 27 22.04	1.8377	4 54 35.0	12.373
21	8 59 39.53	1.9112	13 57 44.5	10.471	21	10 29 12.29	1.8373	4 42 11.9	12.397
22	9 1 34.13	1.9087	13 47 14.5	10.528	22	10 31 2.52	1.8369	4 29 47.4	12.418
23	9 3 28.57	1.9062	13 36 41.1	10.585	23	10 32 52.72	1.8366	4 17 21.7	12.440
24	9 5 22.87	1.9037	N. 13 26 4.3	10.641	24	10 34 42.91	1.8361	N. 4 4 54.6	12.462

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 29.					TUESDAY 31.				
0	10 34 42.91	1.8364	N. 4 4 54.6	12.462	0	12 3 43.55	1.8963	S. 6 3 14.3	12.587
1	10 36 33.09	1.8362	3 52 26.3	12.482	1	12 5 37.41	1.8992	6 15 49.0	12.570
2	10 38 23.26	1.8362	3 39 56.8	12.501	2	12 7 31.45	1.9021	6 28 22.7	12.552
3	10 40 13.43	1.8361	3 27 26.2	12.519	3	12 9 25.66	1.9049	6 40 55.3	12.534
4	10 42 3.59	1.8361	3 14 54.5	12.537	4	12 11 20.04	1.9079	6 53 26.8	12.515
5	10 43 53.76	1.8362	3 2 21.8	12.554	5	12 13 14.61	1.9111	7 5 57.1	12.495
6	10 45 43.93	1.8362	2 49 48.0	12.571	6	12 15 9.37	1.9142	7 18 26.2	12.474
7	10 47 34.11	1.8364	2 37 13.3	12.587	7	12 17 4.32	1.9173	7 30 54.0	12.452
8	10 49 24.30	1.8367	2 24 37.6	12.602	8	12 18 59.47	1.9207	7 43 20.4	12.429
9	10 51 14.51	1.8369	2 12 1.1	12.616	9	12 20 54.81	1.9240	7 55 45.5	12.407
10	10 53 4.73	1.8372	1 59 23.7	12.630	10	12 22 50.35	1.9274	8 8 9.2	12.382
11	10 54 54.98	1.8377	1 46 45.5	12.642	11	12 24 46.10	1.9309	8 20 31.3	12.356
12	10 56 45.25	1.8381	1 34 6.6	12.654	12	12 26 42.06	1.9345	8 32 51.9	12.330
13	10 58 35.55	1.8387	1 21 27.0	12.666	13	12 28 38.24	1.9381	8 45 10.9	12.303
14	11 0 25.89	1.8392	1 8 46.7	12.677	14	12 30 34.63	1.9418	8 57 28.3	12.275
15	11 2 16.26	1.8398	0 56 5.8	12.687	15	12 32 31.25	1.9456	9 9 43.9	12.246
16	11 4 6.67	1.8406	0 43 24.3	12.696	16	12 34 28.10	1.9494	9 21 57.8	12.217
17	11 5 57.13	1.8413	0 30 42.3	12.704	17	12 36 25.18	1.9532	9 34 9.9	12.186
18	11 7 47.63	1.8421	0 17 59.8	12.712	18	12 38 22.49	1.9572	9 46 20.1	12.153
19	11 9 38.18	1.8430	N. 0 5 16.9	12.718	19	12 40 20.04	1.9612	9 58 28.3	12.121
20	11 11 28.79	1.8440	S. 0 7 26.4	12.725	20	12 42 17.83	1.9652	10 10 34.6	12.087
21	11 13 19.46	1.8450	0 20 10.1	12.731	21	12 44 15.87	1.9694	10 22 38.8	12.053
22	11 15 10.19	1.8460	0 32 54.1	12.735	22	12 46 14.16	1.9736	10 34 41.0	12.017
23	11 17 0.98	1.8472	S. 0 45 38.3	12.738	23	12 48 12.70	1.9778	S. 10 46 40.9	11.981
MONDAY 30.					WEDNESDAY, FEBRUARY 1.				
0	11 18 51.85	1.8484	S. 0 58 22.7	12.742	0	12 50 11.50	1.9822	S. 10 58 38.7	11.944
1	11 20 42.79	1.8497	1 11 7.3	12.745	PHASES OF THE MOON.				
2	11 22 33.81	1.8510	1 23 52.1	12.747					
3	11 24 24.91	1.8523	1 36 36.9	12.747					
4	11 26 16.09	1.8537	1 49 21.8	12.748					
5	11 28 7.36	1.8553	2 2 6.7	12.747	<div> <div> <div></div> <div>d h m</div> </div> <div> <div>☾</div> <div>Last Quarter . . . Jan. 4 15 21.5</div> </div> <div> <div>●</div> <div>New Moon . . . . . 11 10 49.6</div> </div> <div> <div>☾</div> <div>First Quarter . . . . . 18 4 36.2</div> </div> <div> <div>○</div> <div>Full Moon . . . . . 26 7 34.1</div> </div> </div> <div> <div> <div></div> <div>d h</div> </div> <div> <div>☾</div> <div>Perigee . . . . . Jan. 11 13.6</div> </div> <div> <div>☾</div> <div>Apogee . . . . . 25 6.1</div> </div> </div>				
6	11 29 58.73	1.8569	2 14 51.5	12.746					
7	11 31 50.19	1.8585	2 27 36.2	12.743					
8	11 33 41.75	1.8602	2 40 20.7	12.741					
9	11 35 33.42	1.8620	2 53 5.1	12.737					
10	11 37 25.19	1.8638	3 5 49.2	12.732					
11	11 39 17.08	1.8657	3 18 33.0	12.727					
12	11 41 9.08	1.8677	3 31 16.5	12.722					
13	11 43 1.20	1.8697	3 43 59.6	12.714					
14	11 44 53.45	1.8718	3 56 42.2	12.707					
15	11 46 45.82	1.8739	4 9 24.4	12.698					
16	11 48 38.32	1.8762	4 22 6.0	12.689					
17	11 50 30.96	1.8785	4 34 47.1	12.679					
18	11 52 23.74	1.8808	4 47 27.5	12.668					
19	11 54 16.66	1.8832	5 0 7.3	12.657					
20	11 56 9.73	1.8857	5 12 46.3	12.644					
21	11 58 2.95	1.8883	5 25 24.6	12.631					
22	11 59 56.33	1.8909	5 38 2.0	12.617					
23	12 1 49.86	1.8935	5 50 38.6	12.602					
24	12 3 43.55	1.8963	S. 6 3 14.3	12.587					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Aldebaran W.	81 0 33	3073	82 29 16	3067	83 58 6	3061	85 27 3	3056
	Pollux W.	39 20 50	3128	40 48 26	3118	42 16 14	3106	43 44 16	3096
	Spica E.	52 39 33	3039	51 10 8	3034	49 40 37	3028	48 10 59	3023
	JUPITER E.	66 29 26	3109	65 1 27	3104	63 33 22	3099	62 5 11	3093
	VENUS E.	94 31 34	3206	93 5 32	3203	91 39 26	3198	90 13 14	3193
2	Aldebaran W.	92 53 48	3020	94 23 36	3011	95 53 35	3003	97 23 44	2995
	Pollux W.	51 7 39	3043	52 36 59	3031	54 6 33	3021	55 36 20	3009
	MARS W.	37 52 11	2931	39 23 50	2919	40 55 45	2906	42 27 56	2894
	Spica E.	40 41 3	2992	39 10 40	2984	37 40 7	2977	36 9 25	2969
	JUPITER E.	54 42 29	3062	53 13 33	3056	51 44 29	3048	50 15 16	3040
	VENUS E.	83 0 44	3165	81 33 53	3158	80 6 53	3151	78 39 45	3143
	SUN E.	120 3 15	3357	118 40 9	3347	117 16 52	3338	115 53 25	3328
3	Pollux W.	63 8 50	2950	64 40 5	2938	66 11 36	2925	67 43 23	2912
	MARS W.	50 12 54	2830	51 46 43	2816	53 20 50	2803	54 55 14	2789
	Regulus W.	26 7 27	2967	27 38 21	2948	29 9 39	2931	30 41 19	2914
	JUPITER E.	42 46 46	3001	41 16 34	2992	39 46 11	2984	38 15 38	2975
	VENUS E.	71 21 39	3101	69 53 30	3091	68 25 9	3081	66 56 36	3070
	Antares E.	74 3 34	2902	72 31 18	2891	70 58 47	2879	69 26 1	2867
	SUN E.	108 53 7	3273	107 28 24	3261	106 3 27	3248	104 38 15	3235
4	Pollux W.	75 26 36	2842	77 0 9	2827	78 34 2	2812	80 8 14	2796
	MARS W.	62 51 51	2717	64 28 8	2701	66 4 46	2687	67 41 44	2671
	Regulus W.	38 24 53	2832	39 58 39	2816	41 32 46	2799	43 7 15	2783
	VENUS E.	59 30 34	3014	58 0 39	3003	56 30 30	2991	55 0 6	2978
	Antares E.	61 38 12	2801	60 3 46	2788	58 29 2	2772	56 53 58	2758
	SUN E.	97 28 12	3163	96 1 19	3148	94 34 7	3132	93 6 36	3115
5	Pollux W.	88 4 26	2716	89 40 45	2699	91 17 26	2682	92 54 30	2664
	MARS W.	75 51 59	2588	77 31 10	2572	79 10 44	2554	80 50 42	2536
	Regulus W.	51 5 12	2696	52 41 57	2679	54 19 5	2660	55 56 38	2643
	VENUS E.	47 24 9	2916	45 52 10	2902	44 19 54	2891	42 47 23	2878
	Antares E.	48 53 37	2679	47 16 29	2663	45 38 59	2646	44 1 6	2628
	SUN E.	85 43 55	3029	84 14 18	3011	82 44 19	2993	81 13 57	2973
6	MARS W.	89 16 44	2446	90 59 13	2429	92 42 7	2410	94 25 27	2391
	Regulus W.	64 10 34	2550	65 50 38	2531	67 31 8	2512	69 12 5	2493
	Antares E.	35 45 45	2540	34 5 28	2522	32 24 46	2504	30 43 39	2487
	SUN E.	73 36 4	2876	72 3 14	2856	70 29 59	2836	68 56 18	2816
7	Regulus W.	77 43 31	2397	79 27 10	2378	81 11 16	2359	82 55 49	2340
	Spica W.	23 42 57	2420	25 26 3	2397	27 9 42	2374	28 53 54	2353
	SUN E.	61 1 16	2714	59 24 55	2694	57 48 7	2674	56 10 52	2654
8	Regulus W.	91 45 21	2249	93 32 35	2233	95 20 14	2215	97 8 19	2198
	Spica W.	37 42 27	2253	39 29 36	2234	41 17 13	2216	43 5 17	2198
	SUN E.	47 57 54	2356	46 17 59	2338	44 37 38	2320	42 56 52	2302
9	Spica W.	52 12 4	2116	54 2 38	2102	55 53 34	2088	57 44 51	2075
	JUPITER W.	37 40 17	2204	39 28 39	2184	41 17 30	2167	43 6 48	2151
	SUN E.	34 26 56	2419	32 43 48	2404	31 0 19	2389	29 16 29	2376

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	Aldebaran	W.	86 56 7	3049	88 25 19	3042	89 54 40	3034	91 24 10	3028
	Pollux	W.	45 12 30	3086	46 40 57	3074	48 9 38	3064	49 38 32	3053
	Spica	E.	46 41 15	3018	45 11 24	3011	43 41 25	3005	42 11 18	2998
	JUPITER	E.	60 36 53	3087	59 8 28	3082	57 39 56	3075	56 11 16	3069
	VENUS	E.	88 46 57	3188	87 20 34	3183	85 54 4	3178	84 27 28	3171
2	Aldebaran	W.	98 54 3	2985	100 24 34	2977	101 55 16	2967	103 26 10	2957
	Pollux	W.	57 6 21	2998	58 36 36	2986	60 7 6	2975	61 37 50	2962
	MARS	W.	44 0 23	2881	45 33 6	2868	47 6 6	2855	48 39 22	2843
	Spica	E.	34 38 33	2961	33 7 31	2954	31 36 20	2946	30 4 59	2937
	JUPITER	E.	48 45 53	3033	47 16 21	3025	45 46 39	3018	44 16 48	3009
	VENUS	E.	77 12 28	3135	75 45 1	3127	74 17 24	3119	72 49 37	3110
	SUN	E.	114 29 46	3318	113 5 55	3307	111 41 52	3296	110 17 36	3285
3	Pollux	W.	69 15 26	2898	70 47 47	2885	72 20 25	2871	73 53 21	2856
	MARS	W.	56 29 56	2775	58 4 56	2761	59 40 15	2747	61 15 53	2732
	Regulus	W.	32 13 20	2898	33 45 42	2881	35 18 25	2866	36 51 28	2848
	JUPITER	E.	36 44 54	2967	35 14 0	2960	33 42 57	2952	32 11 44	2946
	VENUS	E.	65 27 50	3060	63 58 52	3049	62 29 40	3038	61 0 14	3026
	Antares	E.	67 53 0	2855	66 19 43	2842	64 46 10	2829	63 12 20	2815
	SUN	E.	103 12 47	3222	101 47 4	3208	100 21 4	3193	98 54 47	3178
4	Pollux	W.	81 42 47	2781	83 17 40	2765	84 52 54	2749	86 28 29	2732
	MARS	W.	69 19 3	2655	70 56 44	2639	72 34 46	2622	74 13 11	2605
	Regulus	W.	44 42 5	2766	46 17 18	2749	47 52 53	2732	49 28 51	2714
	VENUS	E.	53 29 26	2965	51 58 30	2954	50 27 19	2941	48 55 52	2928
	Antares	E.	55 18 35	2743	53 42 52	2727	52 6 48	2711	50 30 23	2695
	SUN	E.	91 38 45	3099	90 10 34	3082	88 42 2	3065	87 13 9	3047
5	Pollux	W.	94 31 58	2647	96 9 49	2630	97 48 3	2612	99 26 42	2594
	MARS	W.	82 31 5	2519	84 11 52	2501	85 53 4	2483	87 34 41	2465
	Regulus	W.	57 34 35	2624	59 12 57	2606	60 51 44	2588	62 30 56	2569
	VENUS	E.	41 14 36	2866	39 41 34	2855	38 8 17	2844	36 34 46	2834
	Antares	E.	42 22 49	2611	40 44 9	2593	39 5 5	2576	37 25 37	2559
	SUN	E.	79 43 11	2954	78 12 1	2935	76 40 27	2916	75 8 28	2896
6	MARS	W.	96 9 14	2373	97 53 28	2355	99 38 8	2336	101 23 15	2317
	Regulus	W.	70 53 28	2472	72 35 18	2455	74 17 35	2436	76 0 19	2416
	Antares	E.	29 2 8	2470	27 20 12	2452	25 37 51	2434	23 55 5	2417
	SUN	E.	67 22 11	2795	65 47 37	2775	64 12 37	2755	62 37 10	2735
7	Regulus	W.	84 40 50	2322	86 26 18	2304	88 12 12	2285	89 58 33	2267
	Spica	W.	30 38 37	2331	32 23 51	2311	34 9 34	2291	35 55 46	2272
	SUN	E.	54 33 10	2634	52 55 1	2614	51 16 25	2595	49 37 23	2575
8	Regulus	W.	98 56 49	2182	100 45 43	2167	102 35 1	2151	104 24 42	2136
	Spica	W.	44 53 48	2180	46 42 45	2164	48 32 7	2147	50 21 54	2132
	SUN	E.	41 15 41	2484	39 34 5	2467	37 52 5	2450	36 9 42	2434
9	Spica	W.	59 36 29	2062	61 28 27	2050	63 20 43	2039	65 13 17	2028
	JUPITER	W.	44 56 30	2135	46 46 36	2120	48 37 5	2107	50 27 54	2095
	SUN	E.	27 32 20	2364	25 47 53	2351	24 3 8	2340	22 18 7	2329

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
13	SUN	W.	22 11 44	2319	23 57 16	2328	25 42 34	2339	27 27 36	2350
	α Arietis	E.	80 43 45	2029	78 50 56	2040	76 58 24	2051	75 6 9	2062
14	SUN	W.	36 8 20	2419	37 51 28	2433	39 34 15	2450	41 16 39	2466
	α Arietis	E.	65 49 37	2129	63 59 22	2144	62 9 30	2160	60 20 2	2176
	Aldebaran	E.	98 37 52	2151	96 48 10	2165	94 58 50	2180	93 9 52	2195
15	SUN	W.	49 42 42	2534	51 22 40	2573	53 2 12	2592	54 41 18	2612
	α Arietis	E.	51 19 5	2265	49 32 14	2285	47 45 52	2304	45 59 58	2324
	Aldebaran	E.	84 10 57	2278	82 24 25	2296	80 38 19	2314	78 52 40	2333
16	SUN	W.	62 50 12	2710	64 26 39	2729	66 2 40	2750	67 38 14	2769
	α Arietis	E.	37 17 56	2431	35 35 6	2454	33 52 48	2478	32 11 4	2502
	Aldebaran	E.	70 11 12	2428	68 28 17	2448	66 45 50	2467	65 3 51	2487
17	SUN	W.	75 29 35	2868	77 2 35	2887	78 35 10	2906	80 7 21	2926
	Fomalhaut	W.	47 26 29	3397	48 48 49	3371	50 11 39	3349	51 34 54	3332
	Aldebaran	E.	56 40 56	2588	55 1 45	2610	53 23 3	2629	51 44 48	2651
	Pollux	E.	98 27 59	2566	96 48 18	2584	95 9 1	2602	93 30 9	2619
18	SUN	W.	87 42 17	3018	89 12 8	3035	90 41 37	3052	92 10 45	3069
	Fomalhaut	W.	58 35 12	3282	59 59 45	3277	61 24 23	3276	62 49 3	3275
	α Pegasi	W.	35 57 36	3074	37 26 17	3058	38 55 18	3048	40 24 31	3042
	Aldebaran	E.	43 40 41	2757	42 5 17	2780	40 30 23	2803	38 55 59	2826
	Pollux	E.	85 21 37	2704	83 45 2	2720	82 8 49	2737	80 32 58	2753
	MARS	E.	92 35 1	2556	90 55 5	2572	89 15 31	2587	87 36 18	2601
19	SUN	W.	99 31 22	3149	100 58 32	3164	102 25 24	3178	103 51 59	3193
	Fomalhaut	W.	69 52 15	3285	71 16 44	3288	72 41 9	3294	74 5 28	3300
	α Pegasi	W.	47 51 52	3034	49 21 22	3036	50 50 50	3039	52 20 15	3043
	Pollux	E.	72 38 51	2829	71 5 1	2843	69 31 29	2858	67 58 16	2872
	MARS	E.	79 25 15	2674	77 48 0	2687	76 11 3	2701	74 34 24	2713
20	SUN	W.	111 0 49	3252	112 25 50	3270	113 50 36	3282	115 15 9	3292
	Fomalhaut	W.	81 5 16	3332	82 28 50	3340	83 52 15	3348	85 15 31	3356
	α Pegasi	W.	59 46 2	3066	61 14 53	3071	62 43 38	3078	64 12 15	3082
	Pollux	E.	60 16 32	2939	58 45 2	2950	57 13 47	2963	55 42 48	2975
	MARS	E.	66 35 19	2774	65 0 17	2785	63 25 30	2796	61 50 57	2808
	Regulus	E.	97 3 15	2896	95 30 51	2907	93 58 41	2917	92 26 44	2927
21	Fomalhaut	W.	92 9 28	3400	93 31 45	3409	94 53 51	3418	96 15 47	3429
	α Pegasi	W.	71 33 40	3111	73 1 36	3116	74 29 26	3122	75 57 9	3127
	α Arietis	W.	28 0 25	3099	29 29 49	3041	30 59 11	3043	32 28 31	3044
	Pollux	E.	48 11 40	3035	46 42 11	3047	45 12 56	3059	43 43 56	3070
	MARS	E.	54 1 37	2857	52 28 23	2866	50 55 21	2876	49 22 31	2885
	Regulus	E.	84 50 0	2972	83 19 12	2981	81 48 35	2989	80 18 8	2995
22	α Pegasi	W.	83 14 10	3153	84 41 16	3157	86 8 17	3162	87 35 12	3166
	α Arietis	W.	39 54 32	3096	41 23 35	3060	42 52 34	3062	44 21 30	3065
	Pollux	E.	36 22 42	3196	34 55 16	3151	33 28 8	3167	32 1 19	3183
	MARS	E.	41 41 13	2929	40 9 31	2938	38 38 0	2947	37 6 41	2957
	Regulus	E.	72 47 58	3028	71 18 20	3033	69 48 48	3039	68 19 23	3043

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
13	SUN	W.	29 12 22	2363	30 56 50	2375	32 41 0	2389	34 24 50	2403
	α Arietis	E.	73 14 11	2074	71 22 32	2087	69 31 13	2100	67 40 14	2115
14	SUN	W.	42 58 40	2483	44 40 17	2500	46 21 30	2517	48 2 19	2536
	α Arietis	E.	58 30 59	2193	56 42 21	2210	54 54 9	2229	53 6 24	2246
	Aldebaran	E.	91 21 17	2211	89 33 6	2227	87 45 18	2243	85 57 55	2260
15	SUN	W.	56 19 57	2630	57 58 11	2650	59 35 58	2670	61 13 18	2689
	α Arietis	E.	44 14 33	2344	42 29 38	2365	40 45 13	2387	39 1 19	2408
	Aldebaran	E.	77 7 28	2351	75 22 43	2370	73 38 25	2389	71 54 35	2408
16	SUN	W.	69 13 22	2789	70 48 4	2809	72 22 20	2829	73 56 10	2848
	α Arietis	E.	30 29 54	2528	28 49 20	2556	27 9 24	2585	25 30 8	2616
	Aldebaran	E.	63 22 20	2507	61 41 17	2527	60 0 42	2548	58 20 35	2568
17	SUN	W.	81 39 7	2945	83 10 29	2963	84 41 28	2981	86 12 4	3000
	Fomalhaut	W.	52 58 29	3317	54 22 21	3304	55 46 28	3294	57 10 46	3288
	Aldebaran	E.	50 7 2	2672	48 29 44	2693	46 52 55	2714	45 16 34	2735
	Pollux	E.	91 51 40	2637	90 13 35	2654	88 35 53	2671	86 58 34	2687
18	SUN	W.	93 39 32	3086	95 7 59	3102	96 36 6	3119	98 3 53	3133
	Fomalhaut	W.	64 13 44	3275	65 38 25	3276	67 3 4	3278	68 27 41	3281
	α Pegasi	W.	41 53 52	3037	43 23 19	3034	44 52 49	3034	46 22 20	3033
	Aldebaran	E.	37 22 5	2850	35 48 42	2876	34 15 52	2901	32 43 35	2929
	Pollux	E.	78 57 28	2769	77 22 19	2784	75 47 30	2799	74 13 1	2814
	MARS	E.	85 57 25	2617	84 18 53	2632	82 40 41	2646	81 2 48	2660
19	SUN	W.	105 18 17	3206	106 44 19	3220	108 10 4	3233	109 35 34	3246
	Fomalhaut	W.	75 29 40	3306	76 53 45	3312	78 17 43	3319	79 41 33	3325
	α Pegasi	W.	53 49 35	3047	55 18 50	3051	56 48 0	3056	58 17 4	3060
	Pollux	E.	66 25 21	2885	64 52 43	2899	63 20 23	2912	61 48 19	2925
	MARS	E.	72 58 2	2726	71 21 57	2738	69 46 8	2751	68 10 36	2763
20	SUN	W.	116 39 30	3303	118 3 38	3313	119 27 34	3324	120 51 18	3332
	Fomalhaut	W.	86 38 38	3365	88 1 35	3372	89 24 23	3381	90 47 1	3391
	α Pegasi	W.	65 40 46	3088	67 9 10	3094	68 37 27	3100	70 5 37	3105
	Pollux	E.	54 12 4	2987	52 41 35	3000	51 11 22	3012	49 41 24	3023
	MARS	E.	60 16 39	2818	58 42 34	2828	57 8 42	2838	55 35 3	2848
	Regulus	E.	90 54 59	2937	89 23 27	2946	87 52 7	2955	86 20 58	2964
21	Fomalhaut	W.	97 37 31	3438	98 59 4	3449	100 20 25	3459	101 41 35	3471
	α Pegasi	W.	77 24 46	3133	78 52 16	3138	80 19 40	3143	81 46 58	3148
	α Arietis	W.	33 57 49	3047	35 27 4	3048	36 56 17	3052	38 25 26	3054
	Pollux	E.	42 15 10	3083	40 46 40	3096	39 18 25	3108	37 50 25	3122
	MARS	E.	47 49 53	2894	46 17 26	2903	44 45 11	2911	43 13 6	2920
	Regulus	E.	78 47 49	3002	77 17 39	3009	75 47 38	3015	74 17 44	3022
22	α Pegasi	W.	89 2 2	3170	90 28 47	3174	91 55 27	3178	93 22 2	3183
	α Arietis	W.	45 50 22	3068	47 19 11	3070	48 47 57	3073	50 16 40	3074
	Pollux	E.	30 34 50	3202	29 8 43	3224	27 43 2	3247	26 17 49	3273
	MARS	E.	35 35 34	2967	34 4 40	2976	32 33 57	2987	31 3 28	2998
	Regulus	E.	66 50 4	3048	65 20 51	3053	63 51 44	3057	62 22 42	3061

GREENWICH MEAN TIME.									
LUNAR DISTANCES.									
Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	$\alpha$ Arietis W.	51 45 21	3077	53 13 59	3079	54 42 34	3081	56 11 7	3082
	Aldebaran W.	20 11 39	3416	21 33 37	3373	22 56 24	3339	24 19 50	3312
	Regulus E.	60 53 45	3065	59 24 53	3069	57 56 5	3072	56 27 21	3075
24	$\alpha$ Arietis W.	63 33 26	3088	65 1 50	3089	66 30 13	3089	67 58 36	3090
	Aldebaran W.	31 23 41	3223	32 49 23	3212	34 15 18	3203	35 41 24	3194
	Regulus E.	49 4 37	3089	47 36 14	3091	46 7 54	3094	44 39 37	3096
	Spica E.	103 3 58	3072	101 35 14	3073	100 6 31	3074	98 37 50	3074
25	$\alpha$ Arietis W.	75 20 25	3090	76 48 47	3089	78 17 10	3088	79 45 34	3087
	Aldebaran W.	42 54 9	3162	44 21 4	3157	45 48 5	3152	47 15 12	3148
	Regulus E.	37 18 50	3107	35 50 49	3110	34 22 51	3112	32 54 56	3115
	Spica E.	91 14 31	3076	89 45 52	3075	88 17 12	3075	86 48 32	3074
26	$\alpha$ Arietis W.	87 7 51	3082	88 36 23	3080	90 4 57	3078	91 33 33	3076
	Aldebaran W.	54 32 2	3128	55 59 38	3124	57 27 19	3119	58 55 5	3116
	Spica E.	79 24 57	3069	77 56 10	3068	76 27 21	3066	74 58 30	3064
	JUPITER E.	96 2 42	3116	94 34 52	3114	93 7 0	3113	91 39 6	3110
27	Aldebaran W.	66 15 1	3097	67 43 14	3093	69 11 32	3090	70 39 54	3086
	Pollux W.	24 55 59	3276	26 20 39	3248	27 45 51	3226	29 11 29	3208
	Spica E.	67 33 38	3053	66 4 31	3051	64 35 21	3048	63 6 8	3045
	JUPITER E.	84 18 55	3099	82 50 44	3096	81 22 29	3093	79 54 11	3090
28	Aldebaran W.	78 2 59	3065	79 31 52	3060	81 0 50	3056	82 29 54	3052
	Pollux W.	36 24 40	3134	37 52 8	3124	39 19 49	3112	40 47 44	3102
	MARS W.	32 42 39	2970	34 13 29	2961	35 44 31	2952	37 15 44	2944
	Spica E.	55 39 6	3029	54 9 29	3026	52 39 48	3022	51 10 2	3018
	JUPITER E.	72 31 42	3073	71 3 0	3069	69 34 13	3065	68 5 21	3062
	Antares E.	101 14 25	3022	99 44 40	3019	98 14 51	3014	96 44 56	3010
29	Pollux W.	48 10 15	3056	49 39 18	3047	51 8 32	3039	52 37 57	3030
	MARS W.	44 54 22	2905	46 26 35	2898	47 58 57	2891	49 31 28	2883
	Spica E.	43 39 56	2997	42 9 39	2991	40 39 15	2986	39 8 45	2981
	JUPITER E.	60 39 47	3040	59 10 24	3035	57 40 55	3030	56 11 20	3026
	Antares E.	89 13 56	2985	87 43 25	2981	86 12 48	2974	84 42 3	2969
	SATURN E.	101 54 37	3022	100 24 51	3016	98 54 58	3010	97 24 58	3005
30	Pollux W.	60 7 38	2988	61 38 6	2979	63 8 45	2970	64 39 35	2961
	MARS W.	57 16 23	2846	58 49 51	2838	60 23 29	2831	61 57 17	2823
	Regulus W.	23 7 1	3015	24 36 55	2999	26 7 9	2985	27 37 41	2970
	JUPITER E.	48 41 51	2999	47 11 37	2994	45 41 17	2989	44 10 50	2983
	Antares E.	77 6 25	2936	75 34 52	2929	74 3 10	2922	72 31 19	2914
	SATURN E.	89 53 1	2971	88 22 12	2964	86 51 14	2957	85 20 7	2949
	VENUS E.	93 35 57	3289	92 11 33	3282	90 47 1	3274	89 22 19	3266
31	Pollux W.	72 16 39	2914	73 48 40	2904	75 20 54	2894	76 53 20	2883
	MARS W.	69 48 58	2779	71 23 53	2771	72 58 59	2762	74 34 17	2752
	Regulus W.	35 14 34	2908	36 46 43	2895	38 19 8	2883	39 51 48	2872
	Antares E.	64 49 30	2872	63 16 35	2863	61 43 29	2854	60 10 11	2844
	SATURN E.	77 41 56	2906	76 9 45	2897	74 37 22	2887	73 4 47	2877
	VENUS E.	82 16 23	3222	80 50 40	3212	79 24 45	3203	77 58 39	3193

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	♈ Arietis W.	57 39 38	3084	59 8 7	3085	60 36 35	3087	62 5 1	3087
	Aldebaran W.	25 43 48	3288	27 8 14	3267	28 33 4	3250	29 58 14	3236
	Regulus E.	54 58 41	3078	53 30 5	3081	52 1 32	3084	50 33 3	3087
24	♈ Arietis W.	69 26 58	3090	70 55 20	3091	72 23 41	3090	73 52 3	3090
	Aldebaran W.	37 7 40	3187	38 34 5	3179	40 0 39	3173	41 27 20	3167
	Regulus E.	43 11 22	3098	41 43 10	3101	40 15 1	3102	38 46 54	3105
	Spica E.	97 9 9	3075	95 40 29	3076	94 11 50	3075	92 43 10	3076
25	♈ Arietis W.	81 13 59	3087	82 42 25	3086	84 10 52	3084	85 39 21	3083
	Aldebaran W.	48 42 24	3143	50 9 41	3139	51 37 3	3135	53 4 30	3131
	Regulus E.	31 27 5	3119	29 59 18	3123	28 31 36	3127	27 3 59	3132
	Spica E.	85 19 51	3074	83 51 10	3073	82 22 27	3072	80 53 43	3070
26	♈ Arietis W.	93 2 12	3074	94 30 53	3073	95 59 36	3070	97 28 22	3069
	Aldebaran W.	60 22 55	3112	61 50 50	3109	63 18 49	3105	64 46 53	3101
	Spica E.	73 29 36	3062	72 0 40	3060	70 31 42	3058	69 2 41	3056
	JUPITER E.	90 11 9	3109	88 43 10	3106	87 15 8	3104	85 47 3	3101
27	Aldebaran W.	72 8 21	3082	73 36 53	3078	75 5 30	3073	76 34 12	3069
	Pollux W.	30 37 29	3190	32 3 50	3174	33 30 30	3160	34 57 27	3147
	Spica E.	61 36 51	3042	60 7 30	3039	58 38 6	3036	57 8 38	3033
	JUPITER E.	78 25 49	3087	76 57 23	3084	75 28 54	3080	74 0 20	3077
28	Aldebaran W.	83 59 3	3047	85 28 18	3041	86 57 40	3037	88 27 7	3031
	Pollux W.	42 15 51	3092	43 44 10	3082	45 12 41	3073	46 41 23	3065
	MARS W.	38 47 7	2935	40 18 41	2927	41 50 25	2920	43 22 19	2912
	Spica E.	49 40 11	3014	48 10 15	3009	46 40 14	3005	45 10 8	3001
	JUPITER E.	66 36 25	3058	65 7 24	3053	63 38 17	3049	62 9 5	3044
	Antares E.	95 14 56	3005	93 44 50	3001	92 14 38	2996	90 44 20	2991
29	Pollux W.	54 7 32	3022	55 37 18	3014	57 7 14	3005	58 37 21	2997
	MARS W.	51 4 8	2876	52 36 58	2869	54 9 57	2862	55 43 5	2854
	Spica E.	37 38 9	2977	36 7 27	2972	34 36 39	2966	33 5 44	2962
	JUPITER E.	54 41 39	3021	53 11 52	3015	51 41 58	3010	50 11 58	3005
	Antares E.	83 11 11	2962	81 40 11	2957	80 9 4	2950	78 37 49	2943
	SATURN E.	95 54 51	2998	94 24 36	2992	92 54 13	2985	91 23 41	2978
30	Pollux W.	66 10 37	2952	67 41 50	2943	69 13 14	2934	70 44 50	2924
	MARS W.	63 31 15	2815	65 5 24	2806	66 39 44	2798	68 14 15	2788
	Regulus W.	29 8 31	2957	30 39 38	2944	32 11 1	2931	33 42 40	2920
	JUPITER E.	42 40 16	2978	41 9 36	2973	39 38 49	2967	38 7 55	2962
	Antares E.	70 59 18	2906	69 27 7	2898	67 54 45	2890	66 22 13	2881
	SATURN E.	83 48 50	2941	82 17 23	2932	80 45 45	2924	79 13 56	2915
	VENUS E.	87 57 28	3238	86 32 27	3249	85 7 16	3241	83 41 55	3231
31	Pollux W.	78 26 0	2873	79 58 53	2862	81 32 0	2852	83 5 21	2840
	MARS W.	76 9 48	2742	77 45 32	2732	79 21 29	2722	80 57 40	2711
	Regulus W.	41 24 43	2860	42 57 53	2848	44 31 19	2835	46 5 1	2824
	Antares E.	58 36 40	2835	57 2 57	2824	55 29 0	2813	53 54 49	2803
	SATURN E.	71 31 59	2868	69 58 59	2857	68 25 45	2847	66 52 18	2835
	VENUS E.	76 32 21	3183	75 5 51	3171	73 39 7	3160	72 12 10	3148

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Wed.	1	<sup>h</sup> 20 <sup>m</sup> 59 <sup>s</sup> 44.82	10.184	S. 17° 4' 19.1	+42.77	16 16.05	68.26	13 48.54	0.327
Thur.	2	21 3 48.84	10.150	16 47 3.4	43.52	16 15.89	68.15	13 55.98	0.293
Frid.	3	21 7 52.05	10.117	16 29 30.2	44.25	16 15.73	68.03	14 2.62	0.260
Sat.	4	21 11 54.46	10.084	16 11 39.6	+44.96	16 15.57	67.92	14 8.46	0.227
SUN.	5	21 15 56.08	10.051	15 53 32.2	45.65	16 15.40	67.80	14 13.50	0.194
Mon.	6	21 19 56.89	10.018	15 35 8.4	46.33	16 15.23	67.69	14 17.75	0.161
Tues.	7	21 23 56.92	9.985	15 16 28.5	+46.98	16 15.05	67.57	14 21.22	0.128
Wed.	8	21 27 56.16	9.952	14 57 33.1	47.62	16 14.87	67.46	14 23.88	0.095
Thur.	9	21 31 54.59	9.919	14 38 22.6	48.24	16 14.69	67.34	14 25.76	0.062
Frid.	10	21 35 52.25	9.886	14 18 57.4	+48.85	16 14.51	67.23	14 26.87	0.029
Sat.	11	21 39 49.13	9.854	13 59 18.0	49.43	16 14.33	67.12	14 27.19	0.003
SUN.	12	21 43 45.24	9.822	13 39 24.8	50.00	16 14.14	67.01	14 26.74	0.035
Mon.	13	21 47 40.57	9.790	13 19 18.2	+50.55	16 13.95	66.91	14 25.53	0.066
Tues.	14	21 51 35.15	9.758	12 58 58.8	51.07	16 13.76	66.80	14 23.55	0.098
Wed.	15	21 55 28.97	9.727	12 38 26.8	51.58	16 13.56	66.69	14 20.83	0.129
Thur.	16	21 59 22.05	9.696	12 17 42.8	+52.07	16 13.36	66.59	14 17.36	0.160
Frid.	17	22 3 14.39	9.666	11 56 47.2	52.55	16 13.16	66.49	14 13.16	0.190
Sat.	18	22 7 6.02	9.636	11 35 40.3	53.01	16 12.96	66.39	14 8.25	0.220
SUN.	19	22 10 56.94	9.607	11 14 22.6	+53.45	16 12.75	66.29	14 2.63	0.249
Mon.	20	22 14 47.17	9.579	10 52 54.5	53.88	16 12.54	66.20	13 56.32	0.277
Tues.	21	22 18 36.72	9.551	10 31 16.4	54.29	16 12.33	66.11	13 49.34	0.304
Wed.	22	22 22 25.62	9.524	10 9 28.7	+54.68	16 12.11	66.02	13 41.71	0.331
Thur.	23	22 26 13.88	9.498	9 47 31.8	55.06	16 11.88	65.93	13 33.44	0.358
Frid.	24	22 30 1.52	9.473	9 25 26.0	55.42	16 11.66	65.84	13 24.55	0.384
Sat.	25	22 33 48.56	9.448	9 3 11.8	+55.76	16 11.43	65.76	13 15.06	0.408
SUN.	26	22 37 35.02	9.424	8 40 49.4	56.09	16 11.19	65.67	13 4.99	0.431
Mon.	27	22 41 20.92	9.401	8 18 19.3	56.41	16 10.95	65.59	12 54.37	0.454
Tues.	28	22 45 6.28	9.379	7 55 41.9	56.71	16 10.71	65.51	12 43.21	0.476
Wed.	29	22 48 51.13	9.358	S. 7° 32' 57.5	+56.99	16 10.46	65.43	12 31.54	0.497

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Wed.	1	<sup>h</sup> 20 <sup>m</sup> 59 <sup>s</sup> 42.48	10.184	S. 17° 4' 29.0"	+42.76	<sup>m</sup> 13 <sup>s</sup> 48.46	0.327	<sup>h</sup> 20 <sup>m</sup> 45 <sup>s</sup> 54.01
Thur.	2	21 3 46.48	10.150	16 47 13.6	43.51	13 55.91	0.293	20 49 50.57
Frid.	3	21 7 49.68	10.117	16 29 40.6	44.24	14 2.56	0.260	20 53 47.12
Sat.	4	21 11 52.09	10.083	16 11 50.2	+44.95	14 8.41	0.227	20 57 43.68
SUN.	5	21 15 53.69	10.050	15 53 43.1	45.64	14 13.46	0.194	21 1 40.23
Mon.	6	21 19 54.51	10.017	15 35 19.5	46.32	14 17.72	0.161	21 5 36.79
Tues.	7	21 23 54.53	9.984	15 16 39.8	+46.97	14 21.19	0.128	21 9 33.34
Wed.	8	21 27 53.77	9.952	14 57 44.6	47.61	14 23.86	0.095	21 13 29.90
Thur.	9	21 31 52.21	9.919	14 38 34.3	48.23	14 25.75	0.063	21 17 26.46
Frid.	10	21 35 49.87	9.887	14 19 9.3	+48.84	14 26.86	0.030	21 21 23.01
Sat.	11	21 39 46.76	9.854	13 59 30.0	49.42	14 27.20	0.002	21 25 19.56
SUN.	12	21 43 42.87	9.822	13 39 36.9	49.99	14 26.75	0.034	21 29 16.12
Mon.	13	21 47 38.22	9.790	13 19 30.5	+50.54	14 25.55	0.066	21 33 12.67
Tues.	14	21 51 32.81	9.759	12 59 11.1	51.07	14 23.58	0.098	21 37 9.23
Wed.	15	21 55 26.65	9.728	12 38 39.2	51.58	14 20.86	0.129	21 41 5.78
Thur.	16	21 59 19.74	9.697	12 17 55.3	+52.07	14 17.40	0.160	21 45 2.34
Frid.	17	22 3 12.10	9.667	11 56 59.7	52.55	14 13.21	0.190	21 48 58.89
Sat.	18	22 7 3.75	9.637	11 35 52.8	53.01	14 8.30	0.219	21 52 55.45
SUN.	19	22 10 54.69	9.608	11 14 35.2	+53.45	14 2.69	0.248	21 56 52.00
Mon.	20	22 14 44.94	9.580	10 53 7.1	53.88	13 56.39	0.276	22 0 48.56
Tues.	21	22 18 34.52	9.552	10 31 29.0	54.29	13 49.42	0.304	22 4 45.11
Wed.	22	22 22 23.45	9.525	10 9 41.3	+54.68	13 41.78	0.331	22 8 41.66
Thur.	23	22 26 11.73	9.499	9 47 44.3	55.06	13 33.52	0.357	22 12 38.22
Frid.	24	22 29 59.40	9.474	9 25 38.5	55.42	13 24.63	0.382	22 16 34.77
Sat.	25	22 33 46.47	9.450	9 3 24.2	+55.76	13 15.15	0.407	22 20 31.32
SUN.	26	22 37 32.96	9.426	8 41 1.7	56.09	13 5.08	0.431	22 24 27.88
Mon.	27	22 41 18.90	9.403	8 18 31.5	56.41	12 54.47	0.454	22 28 24.43
Tues.	28	22 45 4.30	9.381	7 55 54.0	56.71	12 43.31	0.475	22 32 20.98
Wed.	29	22 48 49.18	9.360	S. 7° 33' 9.5"	+56.99	12 31.64	0.496	22 36 17.54
NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.								Diff. for 1 Hour, + 9 <sup>s</sup> 8565. (Table III.)



AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	32	312 27 57.3	27 34.5	152.15	— 0.40	9.9937031	+28.5	h m s 3 13 34.19
2	33	313 28 48.6	28 25.7	152.11	0.34	9.9937725	29.4	3 9 38.28
3	34	314 29 39.0	29 15.8	152.08	0.27	9.9938441	30.2	3 5 42.37
4	35	315 30 28.6	30 5.4	152.04	— 0.18	9.9939175	+30.9	3 1 46.46
5	36	316 31 17.2	30 53.9	152.00	— 0.06	9.9939926	31.6	2 57 50.55
6	37	317 32 4.8	31 41.3	151.96	+ 0.06	9.9940690	32.2	2 53 54.64
7	38	318 32 51.5	32 27.9	151.92	+ 0.20	9.9941469	+32.7	2 49 58.73
8	39	319 33 37.0	33 13.3	151.87	0.32	9.9942261	33.2	2 46 2.82
9	40	320 34 21.3	33 57.4	151.82	0.44	9.9943065	33.7	2 42 6.91
10	41	321 35 4.3	34 40.3	151.76	+ 0.55	9.9943881	+34.2	2 38 11.00
11	42	322 35 45.9	35 21.8	151.70	0.63	9.9944707	34.6	2 34 15.10
12	43	323 36 26.1	36 1.8	151.64	0.68	9.9945542	35.0	2 30 19.19
13	44	324 37 4.8	36 40.4	151.57	+ 0.71	9.9946390	+35.5	2 26 23.28
14	45	325 37 41.7	37 17.2	151.50	0.70	9.9947248	36.0	2 22 27.37
15	46	326 38 16.9	37 52.3	151.43	0.67	9.9948119	36.5	2 18 31.46
16	47	327 38 50.4	38 25.6	151.36	+ 0.60	9.9949001	+37.0	2 14 35.55
17	48	328 39 22.0	38 57.1	151.28	0.51	9.9949897	37.6	2 10 39.64
18	49	329 39 51.8	39 26.8	151.20	0.40	9.9950807	38.2	2 6 43.74
19	50	330 40 19.8	39 54.7	151.12	+ 0.28	9.9951733	+38.9	2 2 47.83
20	51	331 40 45.8	40 20.6	151.05	0.14	9.9952676	39.6	1 58 51.92
21	52	332 41 10.1	40 44.7	150.97	+ 0.01	9.9953635	40.3	1 54 56.01
22	53	333 41 32.4	41 6.9	150.90	— 0.12	9.9954611	+41.1	1 51 0.10
23	54	334 41 52.9	41 27.3	150.82	0.24	9.9955606	41.9	1 47 4.20
24	55	335 42 11.6	41 45.9	150.75	0.34	9.9956621	42.7	1 43 8.29
25	56	336 42 28.5	42 2.7	150.67	— 0.42	9.9957652	+43.4	1 39 12.38
26	57	337 42 43.8	42 17.9	150.60	0.46	9.9958703	44.2	1 35 16.47
27	58	338 42 57.3	42 31.3	150.53	0.48	9.9959772	44.9	1 31 20.56
28	59	339 43 9.2	42 43.1	150.46	0.47	9.9960858	45.6	1 27 24.66
29	60	340 43 19.5	42 53.3	150.40	— 0.43	9.9961959	+46.2	1 23 28.75
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 16.3	15 21.5	55 56.0	+1.55	56 15.4	+1.68	16 35.1	1.96	20.5
2	15 27.3	15 33.4	56 36.4	1.80	56 58.8	1.92	17 24.0	2.12	21.5
3	15 39.8	15 46.5	57 22.5	2.02	57 47.2	2.09	18 17.1	2.30	22.5
4	15 53.5	16 0.5	58 12.7	+2.13	58 38.5	+2.15	19 14.4	2.47	23.5
5	16 7.5	16 14.4	59 4.2	2.12	59 29.4	2.04	20 15.3	2.58	24.5
6	16 20.8	16 26.8	59 53.2	1.90	60 15.1	1.73	21 17.8	2.61	25.5
7	16 32.1	16 36.5	60 34.6	+1.48	60 50.7	+1.18	22 19.7	2.54	26.5
8	16 39.9	16 42.1	61 3.1	0.85	61 11.2	+0.48	23 19.3	2.42	27.5
9	16 43.0	16 42.6	61 14.5	+0.08	61 13.0	-0.33	0		28.5
10	16 40.8	16 37.8	61 6.6	-0.73	60 55.4	-1.11	0 15.8	2.29	0.1
11	16 33.5	16 28.2	60 39.8	1.46	60 20.3	1.76	1 9.4	2.18	1.1
12	16 22.0	16 15.1	59 57.5	2.01	59 32.1	2.20	2 0.8	2.11	2.1
13	16 7.6	15 59.8	59 4.7	-2.33	58 36.1	-2.40	2 51.0	2.08	3.1
14	15 51.9	15 44.1	58 7.0	2.42	57 38.1	2.38	3 40.8	2.08	4.1
15	15 36.3	15 29.0	57 9.8	2.31	56 42.7	2.19	4 31.0	2.10	5.1
16	15 22.0	15 15.5	56 17.2	-2.05	55 53.4	-1.89	5 21.7	2.12	6.1
17	15 9.7	15 4.4	55 31.8	1.71	55 12.4	1.52	6 12.8	2.13	7.1
18	14 59.7	14 55.8	54 55.3	1.32	54 40.7	1.12	7 3.9	2.12	8.1
19	14 52.4	14 49.7	54 28.5	-0.92	54 18.6	-0.72	7 54.3	2.08	9.1
20	14 47.7	14 46.2	54 11.1	0.53	54 5.8	0.35	8 43.4	2.01	10.1
21	14 45.4	14 45.1	54 2.6	-0.18	54 1.4	-0.03	9 30.7	1.93	11.1
22	14 45.2	14 45.8	54 2.0	+0.12	54 4.3	+0.26	10 16.0	1.85	12.1
23	14 46.9	14 48.3	54 8.2	0.38	54 13.5	0.50	10 59.6	1.79	13.1
24	14 50.1	14 52.3	54 20.1	0.60	54 27.9	0.69	11 42.0	1.75	14.1
25	14 54.7	14 57.3	54 36.7	+0.78	54 46.5	+0.85	12 23.8	1.74	15.1
26	15 0.2	15 3.3	54 57.1	0.92	55 8.6	0.99	13 5.8	1.76	16.1
27	15 6.7	15 10.3	55 20.9	1.05	55 34.0	1.12	13 48.8	1.83	17.1
28	15 14.0	15 18.0	55 47.9	1.18	56 2.4	1.25	14 33.8	1.92	18.1
29	15 22.2	15 26.6	56 17.8	+1.31	56 33.9	+1.37	15 21.5	2.06	19.1

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 1.					FRIDAY 3.				
0	12 50 11.50	1.9822	S. 10 58 38.7	11.944	0	14 31 28.02	2.2569	S. 19 28 16.5	8.837
1	12 52 10.57	1.9867	11 10 34.2	11.905	1	14 33 43.64	2.2637	19 37 3.9	8.743
2	12 54 9.90	1.9911	11 22 27.3	11.865	2	14 35 59.67	2.2705	19 45 45.6	8.647
3	12 56 9.50	1.9956	11 34 18.0	11.825	3	14 38 16.10	2.2778	19 54 21.5	8.548
4	12 58 9.37	2.0002	11 46 6.3	11.784	4	14 40 32.94	2.2850	20 2 51.4	8.448
5	13 0 9.52	2.0049	11 57 52.1	11.742	5	14 42 50.18	2.2928	20 11 15.3	8.348
6	13 2 9.96	2.0097	12 9 35.3	11.698	6	14 45 7.84	2.2977	20 19 33.2	8.247
7	13 4 10.68	2.0144	12 21 15.8	11.652	7	14 47 25.91	2.3045	20 27 44.9	8.143
8	13 6 11.69	2.0192	12 32 53.6	11.607	8	14 49 44.38	2.3113	20 35 50.4	8.038
9	13 8 12.99	2.0242	12 44 28.7	11.561	9	14 52 3.27	2.3182	20 43 49.5	7.932
10	13 10 14.59	2.0291	12 56 0.9	11.513	10	14 54 22.57	2.3250	20 51 42.3	7.825
11	13 12 16.48	2.0342	13 7 30.3	11.465	11	14 56 42.27	2.3318	20 59 28.5	7.715
12	13 14 18.69	2.0393	13 18 56.7	11.415	12	14 59 2.39	2.3387	21 7 8.1	7.605
13	13 16 21.20	2.0444	13 30 20.1	11.364	13	15 1 22.92	2.3456	21 14 41.1	7.494
14	13 18 24.02	2.0497	13 41 40.4	11.312	14	15 3 43.86	2.3524	21 22 7.4	7.381
15	13 20 27.16	2.0549	13 52 57.5	11.258	15	15 6 5.21	2.3592	21 29 26.8	7.266
16	13 22 30.61	2.0602	14 4 11.4	11.204	16	15 8 26.97	2.3661	21 36 39.3	7.150
17	13 24 34.39	2.0657	14 15 22.0	11.149	17	15 10 49.14	2.3729	21 43 44.8	7.032
18	13 26 38.49	2.0711	14 26 29.3	11.093	18	15 13 11.72	2.3797	21 50 43.2	6.914
19	13 28 42.92	2.0766	14 37 33.2	11.036	19	15 15 34.70	2.3864	21 57 34.5	6.794
20	13 30 47.68	2.0822	14 48 33.6	10.977	20	15 17 58.09	2.3932	22 4 18.5	6.672
21	13 32 52.78	2.0877	14 59 30.4	10.917	21	15 20 21.89	2.3999	22 10 55.2	6.550
22	13 34 58.21	2.0934	15 10 23.6	10.856	22	15 22 46.08	2.4066	22 17 24.5	6.426
23	13 37 3.99	2.0992	S. 15 21 13.1	10.794	23	15 25 10.68	2.4133	S. 22 23 46.3	6.300
THURSDAY 2.					SATURDAY 4.				
0	13 39 10.12	2.1051	S. 15 31 58.9	10.731	0	15 27 35.68	2.4200	S. 22 30 0.5	6.172
1	13 41 16.60	2.1108	15 42 40.8	10.666	1	15 30 1.08	2.4266	22 36 7.0	6.044
2	13 43 23.42	2.1167	15 53 18.8	10.600	2	15 32 26.87	2.4331	22 42 5.8	5.915
3	13 45 30.60	2.1227	16 3 52.8	10.533	3	15 34 53.05	2.4397	22 47 56.8	5.783
4	13 47 38.14	2.1286	16 14 22.8	10.465	4	15 37 19.63	2.4462	22 53 39.8	5.651
5	13 49 46.03	2.1346	16 24 48.6	10.395	5	15 39 46.60	2.4527	22 59 14.9	5.517
6	13 51 54.29	2.1407	16 35 10.2	10.325	6	15 42 13.95	2.4590	23 4 41.9	5.382
7	13 54 2.92	2.1469	16 45 27.6	10.254	7	15 44 41.68	2.4654	23 10 0.7	5.245
8	13 56 11.92	2.1531	16 55 40.7	10.181	8	15 47 9.80	2.4717	23 15 11.3	5.107
9	13 58 21.29	2.1592	17 5 49.3	10.106	9	15 49 38.29	2.4779	23 20 13.5	4.967
10	14 0 31.03	2.1655	17 15 53.4	10.031	10	15 52 7.15	2.4842	23 25 7.4	4.827
11	14 2 41.15	2.1718	17 25 53.0	9.955	11	15 54 36.39	2.4903	23 29 52.8	4.686
12	14 4 51.65	2.1782	17 35 48.0	9.877	12	15 57 5.99	2.4964	23 34 29.7	4.543
13	14 7 2.53	2.1846	17 45 38.2	9.797	13	15 59 35.96	2.5024	23 38 58.0	4.398
14	14 9 13.80	2.1910	17 55 23.6	9.716	14	16 2 6.28	2.5083	23 43 17.5	4.253
15	14 11 25.45	2.1974	18 5 4.1	9.634	15	16 4 36.96	2.5142	23 47 28.3	4.107
16	14 13 37.49	2.2039	18 14 39.7	9.551	16	16 7 7.99	2.5200	23 51 30.3	3.958
17	14 15 49.92	2.2104	18 24 10.2	9.466	17	16 9 39.36	2.5257	23 55 23.3	3.808
18	14 18 2.74	2.2170	18 33 35.6	9.381	18	16 12 11.07	2.5313	23 59 7.3	3.658
19	14 20 15.96	2.2236	18 42 55.9	9.294	19	16 14 43.12	2.5369	24 2 42.3	3.507
20	14 22 29.57	2.2302	18 52 10.9	9.205	20	16 17 15.50	2.5424	24 6 8.2	3.354
21	14 24 43.58	2.2368	19 1 20.5	9.115	21	16 19 48.21	2.5477	24 9 24.8	3.200
22	14 26 57.99	2.2436	19 10 24.7	9.024	22	16 22 21.23	2.5530	24 12 32.2	3.043
23	14 29 12.81	2.2502	19 19 23.4	8.932	23	16 24 54.57	2.5582	24 15 30.2	2.889
24	14 31 28.02	2.2569	S. 19 28 16.5	8.837	24	16 27 28.22	2.5634	S. 24 18 18.9	2.732

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 5.					TUESDAY 7.				
0	16 27 28.22	2.5634	S. 24 18 18.9	2.732	0	18 34 5.85	2.6607	S. 23 14 17.7	5.325
1	16 30 2.18	2.5684	24 20 58.1	2.573	1	18 36 45.45	2.6592	23 8 41.0	5.697
2	16 32 36.43	2.5733	24 23 27.7	2.414	2	18 39 24.96	2.6577	23 2 54.1	5.868
3	16 35 10.97	2.5781	24 25 47.8	2.254	3	18 42 4.38	2.6562	22 56 56.8	6.040
4	16 37 45.80	2.5827	24 27 58.2	2.092	4	18 44 43.70	2.6544	22 50 49.3	6.210
5	16 40 20.90	2.5873	24 29 58.9	1.930	5	18 47 22.91	2.6525	22 44 31.6	6.379
6	16 42 56.28	2.5918	24 31 49.8	1.767	6	18 50 2.00	2.6505	22 38 3.8	6.548
7	16 45 31.92	2.5962	24 33 30.9	1.602	7	18 52 40.97	2.6484	22 31 25.8	6.717
8	16 48 7.82	2.6004	24 35 2.1	1.437	8	18 55 19.81	2.6462	22 24 37.8	6.883
9	16 50 43.97	2.6046	24 36 23.4	1.272	9	18 57 58.52	2.6439	22 17 39.8	7.049
10	16 53 20.37	2.6086	24 37 34.7	1.105	10	19 0 37.08	2.6414	22 10 31.9	7.215
11	16 55 57.00	2.6124	24 38 36.0	0.937	11	19 3 15.49	2.6388	22 3 14.0	7.380
12	16 58 33.86	2.6162	24 39 27.2	0.769	12	19 5 53.74	2.6362	21 55 46.3	7.543
13	17 1 10.95	2.6199	24 40 8.3	0.600	13	19 8 31.83	2.6333	21 48 8.9	7.705
14	17 3 48.25	2.6233	24 40 39.2	0.430	14	19 11 9.74	2.6304	21 40 21.7	7.867
15	17 6 25.75	2.6267	24 40 59.9	0.259	15	19 13 47.48	2.6275	21 32 24.9	8.027
16	17 9 3.46	2.6301	24 41 10.3	-0.087	16	19 16 25.04	2.6244	21 24 18.5	8.185
17	17 11 41.36	2.6332	24 41 10.4	+0.084	17	19 19 2.41	2.6212	21 16 2.7	8.342
18	17 14 19.44	2.6362	24 41 0.2	0.236	18	19 21 39.58	2.6178	21 7 37.4	8.499
19	17 16 57.70	2.6390	24 40 39.7	0.429	19	19 24 16.55	2.6144	20 59 2.8	8.654
20	17 19 36.12	2.6417	24 40 8.7	0.603	20	19 26 53.31	2.6109	20 50 18.9	8.808
21	17 22 14.71	2.6444	24 39 27.3	0.777	21	19 29 29.86	2.6074	20 41 25.8	8.961
22	17 24 53.45	2.6468	24 38 35.5	0.951	22	19 32 6.20	2.6037	20 32 23.6	9.112
23	17 27 32.33	2.6492	S. 24 37 33.2	1.126	23	19 34 42.31	2.5999	S. 20 23 12.4	9.268
MONDAY 6.					WEDNESDAY 8.				
0	17 30 11.35	2.6514	S. 24 36 20.4	1.301	0	19 37 18.19	2.5961	S. 20 13 52.2	9.410
1	17 32 50.50	2.6534	24 34 57.1	1.477	1	19 39 53.84	2.5922	20 4 23.2	9.557
2	17 35 29.76	2.6552	24 33 23.2	1.653	2	19 42 29.26	2.5882	19 54 45.3	9.703
3	17 38 9.13	2.6570	24 31 38.7	1.830	3	19 45 4.43	2.5842	19 44 58.8	9.847
4	17 40 48.60	2.6586	24 29 43.6	2.006	4	19 47 39.36	2.5801	19 35 3.7	9.990
5	17 43 28.16	2.6601	24 27 38.0	2.182	5	19 50 14.04	2.5759	19 25 0.0	10.131
6	17 46 7.81	2.6614	24 25 21.7	2.359	6	19 52 48.47	2.5717	19 14 48.0	10.270
7	17 48 47.53	2.6625	24 22 54.9	2.536	7	19 55 22.64	2.5673	19 4 27.6	10.408
8	17 51 27.31	2.6636	24 20 17.4	2.713	8	19 57 56.55	2.5629	18 53 59.0	10.545
9	17 54 7.16	2.6645	24 17 29.3	2.890	9	20 0 30.19	2.5585	18 43 22.2	10.680
10	17 56 47.05	2.6652	24 14 30.6	3.067	10	20 3 3.57	2.5541	18 32 37.4	10.812
11	17 59 26.99	2.6659	24 11 21.2	3.244	11	20 5 36.68	2.5495	18 21 44.7	10.943
12	18 2 6.96	2.6663	24 8 1.3	3.421	12	20 8 9.51	2.5449	18 10 44.2	11.073
13	18 4 46.95	2.6666	24 4 30.7	3.598	13	20 10 42.07	2.5403	17 59 36.0	11.201
14	18 7 26.95	2.6667	24 0 49.5	3.775	14	20 13 14.35	2.5357	17 48 20.1	11.327
15	18 10 6.96	2.6667	23 56 57.7	3.952	15	20 15 46.35	2.5310	17 36 56.7	11.452
16	18 12 46.96	2.6666	23 52 55.3	4.127	16	20 18 18.07	2.5262	17 25 25.9	11.574
17	18 15 26.95	2.6663	23 48 42.4	4.303	17	20 20 49.50	2.5214	17 13 47.8	11.695
18	18 18 6.92	2.6659	23 44 18.9	4.479	18	20 23 20.64	2.5167	17 2 2.5	11.814
19	18 20 46.86	2.6654	23 39 44.9	4.654	19	20 25 51.50	2.5119	16 50 10.1	11.931
20	18 23 26.76	2.6647	23 35 0.4	4.829	20	20 28 22.07	2.5070	16 38 10.8	12.046
21	18 26 6.62	2.6639	23 30 5.4	5.004	21	20 30 52.34	2.5021	16 26 4.6	12.160
22	18 28 46.43	2.6629	23 24 59.9	5.178	22	20 33 22.32	2.4972	16 13 51.6	12.272
23	18 31 26.17	2.6618	23 19 44.0	5.352	23	20 35 52.01	2.4923	16 1 31.9	12.382
24	18 34 5.85	2.6607	S. 23 14 17.7	5.525	24	20 38 21.40	2.4874	S. 15 49 5.8	12.488

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 9.					SATURDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	20 38 21.40	2.4874	S. 15 49 5.8	12.488	1	22 32 18.06	2.2725	S. 4 23 4.4	15.334
2	20 40 50.50	2.4825	15 36 33.3	12.595	2	22 34 34.31	2.2692	4 7 44.0	15.345
3	20 43 19.30	2.4776	15 23 54.4	12.700	3	22 36 50.36	2.2657	3 52 23.0	15.354
4	20 45 47.81	2.4727	15 11 9.3	12.802	4	22 39 6.20	2.2624	3 37 1.5	15.362
5	20 48 16.02	2.4677	14 58 18.2	12.901	5	22 41 21.85	2.2592	3 21 39.6	15.368
6	20 50 43.93	2.4627	14 45 21.2	12.999	6	22 43 37.31	2.2560	3 6 17.3	15.373
7	20 53 11.54	2.4577	14 32 18.3	13.096	7	22 45 52.57	2.2528	2 50 54.8	15.376
8	20 55 38.86	2.4528	14 19 9.7	13.190	8	22 48 7.65	2.2497	2 35 32.2	15.377
9	20 58 5.88	2.4478	14 5 55.5	13.282	9	22 50 22.54	2.2467	2 20 9.6	15.376
10	21 0 32.60	2.4428	13 52 35.9	13.372	10	22 52 37.25	2.2437	2 4 47.1	15.373
11	21 2 59.02	2.4379	13 39 10.9	13.460	11	22 54 51.79	2.2408	1 49 24.8	15.367
12	21 5 25.15	2.4330	13 25 40.7	13.546	12	22 57 6.15	2.2379	1 34 2.9	15.362
13	21 7 50.98	2.4281	13 12 5.4	13.630	13	22 59 20.34	2.2352	1 18 41.4	15.354
14	21 10 16.52	2.4232	12 58 25.1	13.712	14	23 1 34.37	2.2325	1 3 20.4	15.344
15	21 12 41.76	2.4182	12 44 39.9	13.792	15	23 3 48.24	2.2298	0 48 0.1	15.333
16	21 15 6.70	2.4133	12 30 50.0	13.870	16	23 6 1.95	2.2272	0 32 40.4	15.321
17	21 17 31.36	2.4086	12 16 55.5	13.947	17	23 8 15.50	2.2247	0 17 21.6	15.306
18	21 19 55.73	2.4037	12 2 56.4	14.022	18	23 10 28.91	2.2222	S. 0 2 3.7	15.290
19	21 22 19.80	2.3988	11 48 52.9	14.093	19	23 12 42.16	2.2197	N. 0 13 13.2	15.272
20	21 24 43.59	2.3941	11 34 45.2	14.162	20	23 14 55.28	2.2174	0 28 29.0	15.253
21	21 27 7.09	2.3893	11 20 33.4	14.231	21	23 17 8.25	2.2151	0 43 43.6	15.232
22	21 29 30.31	2.3847	11 6 17.5	14.297	22	23 19 21.09	2.2128	0 58 56.9	15.209
23	21 31 53.25	2.3799	10 51 57.7	14.361	23	23 21 33.79	2.2107	1 14 8.7	15.185
24	21 34 15.90	2.3752	S. 10 37 34.2	14.423	24	23 23 46.37	2.2086	N. 1 29 19.1	15.160
FRIDAY 10.					SUNDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	21 36 38.28	2.3707	S. 10 23 6.9	14.484	1	23 25 58.82	2.2065	N. 1 44 27.9	15.132
2	21 39 0.38	2.3661	10 8 36.1	14.542	2	23 28 11.15	2.2046	1 59 35.0	15.103
3	21 41 22.21	2.3615	9 54 1.9	14.597	3	23 30 23.37	2.2027	2 14 40.3	15.073
4	21 43 43.76	2.3569	9 39 24.4	14.652	4	23 32 35.47	2.2007	2 29 43.8	15.042
5	21 46 5.04	2.3525	9 24 43.7	14.703	5	23 34 47.46	2.1989	2 44 45.4	15.009
6	21 48 26.06	2.3481	9 10 0.0	14.753	6	23 36 59.34	2.1972	2 59 44.9	14.974
7	21 50 46.81	2.3436	8 55 13.3	14.802	7	23 39 11.12	2.1955	3 14 42.3	14.938
8	21 53 7.29	2.3392	8 40 23.8	14.848	8	23 41 22.80	2.1938	3 29 37.5	14.900
9	21 55 27.52	2.3350	8 25 31.6	14.892	9	23 43 34.38	2.1922	3 44 30.3	14.861
10	21 57 47.49	2.3307	8 10 36.8	14.933	10	23 45 45.87	2.1907	3 59 20.8	14.822
11	22 0 7.20	2.3264	7 55 39.6	14.973	11	23 47 57.27	2.1892	4 14 8.9	14.780
12	22 2 26.66	2.3222	7 40 40.0	15.012	12	23 50 8.58	2.1878	4 28 54.4	14.736
13	22 4 45.87	2.3182	7 25 38.2	15.048	13	23 52 19.81	2.1866	4 43 37.2	14.691
14	22 7 4.84	2.3141	7 10 34.3	15.082	14	23 54 30.97	2.1853	4 58 17.3	14.646
15	22 9 23.56	2.3100	6 55 28.4	15.114	15	23 56 42.05	2.1840	5 12 54.7	14.599
16	22 11 42.04	2.3060	6 40 20.6	15.145	16	23 58 53.05	2.1828	5 27 29.2	14.550
17	22 14 0.28	2.3021	6 25 11.0	15.173	17	0 1 3.99	2.1817	5 42 0.7	14.500
18	22 16 18.29	2.2982	6 9 59.8	15.200	18	0 3 14.86	2.1807	5 56 29.2	14.449
19	22 18 36.07	2.2944	5 54 47.0	15.225	19	0 5 25.67	2.1797	6 10 54.6	14.397
20	22 20 53.62	2.2907	5 39 32.8	15.247	20	0 7 36.42	2.1787	6 25 16.8	14.343
21	22 23 10.95	2.2869	5 24 17.3	15.268	21	0 9 47.12	2.1779	6 39 35.7	14.288
22	22 25 28.05	2.2832	5 9 0.6	15.287	22	0 11 57.77	2.1770	6 53 51.3	14.232
23	22 27 44.94	2.2797	4 53 42.8	15.304	23	0 14 8.36	2.1762	7 8 3.5	14.174
24	22 30 1.61	2.2760	4 38 24.1	15.320	24	0 16 18.91	2.1755	7 22 12.2	14.115
	22 32 18.06	2.2725	S. 4 23 4.4	15.334		0 18 29.42	2.1748	N. 7 36 17.3	14.053

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 13.					WEDNESDAY 15.				
0	h m s		° ' "		0	h m s		° ' "	
0	18 29.42	2.1748	N. 7 36 17.3	14.055	0	2 2 54.71	2.1888	N. 17 22 7.1	10.010
1	0 20 39.89	2.1742	7 50 18.8	13.994	1	2 5 6.07	2.1897	17 32 4.6	9.907
2	0 22 50.32	2.1736	8 4 16.6	13.932	2	2 7 17.48	2.1907	17 41 55.9	9.802
3	0 25 0.72	2.1731	8 18 10.7	13.869	3	2 9 28.95	2.1916	17 51 40.9	9.697
4	0 27 11.09	2.1726	8 32 0.9	13.804	4	2 11 40.47	2.1925	18 1 19.6	9.592
5	0 29 21.43	2.1721	8 45 47.2	13.738	5	2 13 52.05	2.1935	18 10 51.9	9.485
6	0 31 31.74	2.1717	8 59 29.5	13.672	6	2 16 3.69	2.1944	18 20 17.8	9.378
7	0 33 42.04	2.1714	9 13 7.8	13.604	7	2 18 15.38	2.1953	18 29 37.3	9.271
8	0 35 52.31	2.1711	9 26 42.0	13.535	8	2 20 27.13	2.1963	18 38 50.3	9.162
9	0 38 2.57	2.1708	9 40 12.0	13.464	9	2 22 38.94	2.1973	18 47 56.8	9.054
10	0 40 12.81	2.1707	9 53 37.7	13.392	10	2 24 50.81	2.1982	18 56 56.8	8.945
11	0 42 23.05	2.1705	10 6 59.1	13.321	11	2 27 2.73	2.1992	19 5 50.2	8.835
12	0 44 33.27	2.1703	10 20 16.2	13.248	12	2 29 14.71	2.2002	19 14 37.0	8.725
13	0 46 43.49	2.1703	10 33 28.9	13.173	13	2 31 26.75	2.2012	19 23 17.2	8.615
14	0 48 53.71	2.1703	10 46 37.0	13.097	14	2 33 38.85	2.2021	19 31 50.8	8.504
15	0 51 3.93	2.1703	10 59 40.6	13.021	15	2 35 51.00	2.2030	19 40 17.7	8.392
16	0 53 14.15	2.1704	11 12 39.5	12.943	16	2 38 3.21	2.2039	19 48 37.9	8.281
17	0 55 24.38	2.1705	11 25 33.8	12.866	17	2 40 15.47	2.2048	19 56 51.4	8.168
18	0 57 34.61	2.1707	11 38 23.4	12.787	18	2 42 27.79	2.2058	20 4 58.1	8.054
19	0 59 44.86	2.1708	11 51 8.2	12.706	19	2 44 40.17	2.2067	20 12 57.9	7.941
20	1 1 55.11	2.1710	12 3 48.1	12.624	20	2 46 52.60	2.2077	20 20 51.0	7.827
21	1 4 5.38	2.1712	12 16 23.1	12.542	21	2 49 5.09	2.2086	20 28 37.2	7.712
22	1 6 15.66	2.1716	12 28 53.1	12.459	22	2 51 17.63	2.2095	20 36 16.5	7.598
23	1 8 25.97	2.1719	N. 12 41 18.2	12.375	23	2 53 30.23	2.2103	N. 20 43 49.0	7.483
TUESDAY 14.					THURSDAY 16.				
0	h m s		° ' "		0	h m s		° ' "	
0	1 10 36.29	2.1722	N. 12 53 38.1	12.289	0	2 55 42.87	2.2112	N. 20 51 14.5	7.367
1	1 12 46.64	2.1727	13 5 52.9	12.204	1	2 57 55.57	2.2120	20 58 33.1	7.252
2	1 14 57.01	2.1731	13 18 2.6	12.118	2	3 0 8.31	2.2128	21 5 44.7	7.136
3	1 17 7.41	2.1736	13 30 7.1	12.031	3	3 2 21.10	2.2137	21 12 49.4	7.019
4	1 19 17.84	2.1740	13 42 6.3	11.942	4	3 4 33.95	2.2145	21 19 47.0	6.902
5	1 21 28.29	2.1745	13 54 0.1	11.852	5	3 6 46.84	2.2152	21 26 37.6	6.784
6	1 23 38.78	2.1751	14 5 48.6	11.762	6	3 8 59.77	2.2159	21 33 21.1	6.667
7	1 25 49.30	2.1757	14 17 31.6	11.671	7	3 11 12.75	2.2167	21 39 57.6	6.549
8	1 27 59.86	2.1763	14 29 9.1	11.579	8	3 13 25.78	2.2174	21 46 27.0	6.430
9	1 30 10.46	2.1769	14 40 41.1	11.487	9	3 15 38.84	2.2181	21 52 49.2	6.311
10	1 32 21.09	2.1775	14 52 7.6	11.394	10	3 17 51.95	2.2188	21 59 4.3	6.192
11	1 34 31.76	2.1782	15 3 28.4	11.299	11	3 20 5.10	2.2194	22 5 12.3	6.073
12	1 36 42.47	2.1789	15 14 43.5	11.204	12	3 22 18.28	2.2200	22 11 13.1	5.954
13	1 38 53.23	2.1797	15 25 52.9	11.109	13	3 24 31.50	2.2206	22 17 6.8	5.834
14	1 41 4.03	2.1803	15 36 56.6	11.013	14	3 26 44.75	2.2212	22 22 53.2	5.714
15	1 43 14.87	2.1811	15 47 54.5	10.916	15	3 28 58.04	2.2217	22 28 32.5	5.594
16	1 45 25.76	2.1819	15 58 46.5	10.818	16	3 31 11.36	2.2222	22 34 4.5	5.473
17	1 47 36.70	2.1827	16 9 32.7	10.720	17	3 33 24.71	2.2227	22 39 29.3	5.352
18	1 49 47.69	2.1836	16 20 12.9	10.620	18	3 35 38.08	2.2231	22 44 46.8	5.232
19	1 51 58.73	2.1844	16 30 47.1	10.520	19	3 37 51.48	2.2236	22 49 57.1	5.111
20	1 54 9.82	2.1852	16 41 15.3	10.419	20	3 40 4.91	2.2239	22 55 0.1	4.990
21	1 56 20.96	2.1862	16 51 37.4	10.318	21	3 42 18.35	2.2243	22 59 55.9	4.868
22	1 58 32.16	2.1871	17 1 53.5	10.217	22	3 44 31.82	2.2247	23 4 44.3	4.746
23	2 0 43.41	2.1879	17 12 3.4	10.113	23	3 46 45.31	2.2249	23 9 25.4	4.625
24	2 2 54.71	2.1888	N. 17 22 7.1	10.010	24	3 48 58.81	2.2252	N. 23 13 59.3	4.503

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 17.					SUNDAY 19.				
0	h m s		N. 23 13 59.3	4.503	0	h m s		N. 24 29 9.0	1.332
1	3 48 58.81	2.2252	23 18 25.8	4.381	1	5 37 28.20	2.1853	24 27 45.5	1.449
2	3 53 25.85	2.2255	23 22 45.0	4.258	2	5 39 39.26	2.1834	24 26 15.1	1.566
3	3 55 39.39	2.2257	23 26 56.8	4.136	3	5 41 50.21	2.1814	24 24 37.6	1.682
4	3 57 52.93	2.2257	23 31 1.3	4.013	4	5 44 1.03	2.1794	24 22 53.2	1.798
5	4 0 6.48	2.2257	23 34 58.4	3.891	5	5 46 11.74	2.1774	24 21 1.8	1.915
6	4 2 20.02	2.2257	23 38 48.2	3.768	6	5 48 22.32	2.1753	24 19 3.4	2.030
7	4 4 33.57	2.2258	23 42 30.6	3.645	7	5 50 32.78	2.1732	24 16 58.2	2.144
8	4 6 47.12	2.2258	23 46 5.6	3.522	8	5 52 43.11	2.1711	24 14 46.1	2.259
9	4 9 0.66	2.2256	23 49 33.3	3.400	9	5 54 53.31	2.1689	24 12 27.1	2.373
10	4 11 14.19	2.2254	23 52 53.6	3.277	10	5 57 3.38	2.1667	24 10 1.3	2.487
11	4 13 27.71	2.2252	23 56 6.5	3.153	11	5 59 13.31	2.1643	24 7 28.6	2.601
12	4 15 41.22	2.2251	23 59 12.0	3.031	12	6 1 23.10	2.1621	24 4 49.2	2.713
13	4 17 54.72	2.2248	24 2 10.2	2.908	13	6 3 32.76	2.1598	24 2 3.0	2.827
14	4 20 8.20	2.2245	24 5 1.0	2.785	14	6 5 42.28	2.1574	23 59 10.0	2.939
15	4 22 21.66	2.2242	24 7 44.4	2.662	15	6 7 51.65	2.1550	23 56 10.3	3.050
16	4 24 35.10	2.2237	24 10 20.4	2.538	16	6 10 0.88	2.1526	23 53 4.0	3.161
17	4 26 48.51	2.2232	24 12 49.0	2.416	17	6 12 9.96	2.1501	23 49 51.0	3.272
18	4 29 1.89	2.2228	24 15 10.3	2.292	18	6 14 18.89	2.1476	23 46 31.3	3.383
19	4 31 15.25	2.2223	24 17 24.1	2.169	19	6 16 27.67	2.1451	23 43 5.0	3.493
20	4 33 28.57	2.2217	24 19 30.6	2.047	20	6 18 36.30	2.1426	23 39 32.2	3.603
21	4 35 41.85	2.2211	24 21 29.7	1.924	21	6 20 44.78	2.1400	23 35 52.8	3.711
22	4 37 55.10	2.2204	24 23 21.5	1.802	22	6 22 53.10	2.1373	23 32 6.9	3.819
23	4 40 8.30	2.2197	N. 24 25 5.9	1.678	23	6 25 1.26	2.1347	N. 23 28 14.5	3.927
SATURDAY 18.					MONDAY 20.				
0	4 42 21.46	2.2189	N. 24 26 42.9	1.556	0	6 27 9.26	2.1320	N. 23 24 15.6	4.035
1	4 44 34.57	2.2182	24 28 12.6	1.433	1	6 29 17.10	2.1293	23 20 10.3	4.148
2	4 46 47.64	2.2173	24 29 34.9	1.311	2	6 31 24.78	2.1267	23 15 58.6	4.261
3	4 49 0.65	2.2164	24 30 49.9	1.189	3	6 33 32.30	2.1239	23 11 40.5	4.374
4	4 51 13.61	2.2155	24 31 57.6	1.067	4	6 35 39.65	2.1212	23 7 16.1	4.486
5	4 53 26.51	2.2145	24 32 58.0	0.945	5	6 37 46.84	2.1183	23 2 45.3	4.598
6	4 55 39.35	2.2135	24 33 51.0	0.823	6	6 39 53.85	2.1155	22 58 8.3	4.669
7	4 57 52.13	2.2124	24 34 36.8	0.702	7	6 42 0.70	2.1127	22 53 25.0	4.773
8	5 0 4.84	2.2112	24 35 15.2	0.580	8	6 44 7.38	2.1098	22 48 35.5	4.877
9	5 2 17.48	2.2101	24 35 46.4	0.459	9	6 46 13.88	2.1069	22 43 39.8	4.979
10	5 4 30.05	2.2089	24 36 10.3	0.337	10	6 48 20.21	2.1041	22 38 38.0	5.081
11	5 6 42.55	2.2077	24 36 26.9	0.217	11	6 50 26.37	2.1012	22 33 30.1	5.183
12	5 8 54.97	2.2065	24 36 36.3	+0.097	12	6 52 32.35	2.0982	22 28 16.0	5.285
13	5 11 7.31	2.2050	24 36 38.5	-0.024	13	6 54 38.16	2.0953	22 22 55.9	5.385
14	5 13 19.57	2.2036	24 36 33.4	0.145	14	6 56 43.79	2.0923	22 17 29.8	5.485
15	5 15 31.74	2.2022	24 36 21.1	0.264	15	6 58 49.24	2.0893	22 11 57.7	5.584
16	5 17 43.83	2.2007	24 36 1.7	0.384	16	7 0 54.51	2.0864	22 6 19.7	5.683
17	5 19 55.82	2.1991	24 35 35.0	0.504	17	7 2 59.61	2.0834	22 0 35.7	5.782
18	5 22 7.72	2.1976	24 35 1.2	0.622	18	7 5 4.52	2.0804	21 54 45.9	5.879
19	5 24 19.53	2.1959	24 34 20.3	0.742	19	7 7 9.26	2.0774	21 48 50.2	5.977
20	5 26 31.23	2.1942	24 33 32.2	0.860	20	7 9 13.81	2.0743	21 42 48.7	6.073
21	5 28 42.84	2.1926	24 32 37.1	0.978	21	7 11 18.18	2.0713	21 36 41.5	6.168
22	5 30 54.34	2.1908	24 31 34.8	1.097	22	7 13 22.37	2.0683	21 30 28.5	6.264
23	5 33 5.74	2.1890	24 30 25.4	1.215	23	7 15 26.38	2.0652	21 24 9.8	6.358
24	5 35 17.02	2.1872	N. 24 29 9.0	1.332	24	7 17 30.20	2.0622	N. 21 17 45.5	6.452

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 21.					THURSDAY 23.				
0	7 17 30.20	2.0622	N. 21 17 45.5	6.432	0	8 53 3.73	1.9250	N. 14 31 54.7	10.199
1	7 19 33.84	2.0592	21 11 15.6	6.546	1	8 54 59.16	1.9227	14 21 40.9	10.261
2	7 21 37.30	2.0561	21 4 40.0	6.639	2	8 56 54.45	1.9202	14 11 23.4	10.322
3	7 23 40.57	2.0530	20 57 58.9	6.731	3	8 58 49.59	1.9179	14 1 2.3	10.381
4	7 25 43.66	2.0499	20 51 12.3	6.822	4	9 0 44.60	1.9157	13 50 37.7	10.440
5	7 27 46.56	2.0468	20 44 20.2	6.914	5	9 2 39.48	1.9136	13 40 9.5	10.499
6	7 29 49.28	2.0438	20 37 22.6	7.004	6	9 4 34.23	1.9114	13 29 37.8	10.557
7	7 31 51.82	2.0407	20 30 19.7	7.093	7	9 6 28.85	1.9092	13 19 2.6	10.614
8	7 33 54.17	2.0377	20 23 11.4	7.183	8	9 8 23.34	1.9071	13 8 24.1	10.670
9	7 35 56.34	2.0347	20 15 57.7	7.272	9	9 10 17.70	1.9049	12 57 42.2	10.726
10	7 37 58.33	2.0316	20 8 38.8	7.359	10	9 12 11.93	1.9029	12 46 57.0	10.781
11	7 40 0.13	2.0284	20 1 14.6	7.447	11	9 14 6.05	1.9009	12 36 8.5	10.834
12	7 42 1.74	2.0253	19 53 45.2	7.533	12	9 16 0.04	1.8989	12 25 16.9	10.888
13	7 44 3.17	2.0223	19 46 10.7	7.618	13	9 17 53.92	1.8970	12 14 22.0	10.941
14	7 46 4.42	2.0193	19 38 31.0	7.704	14	9 19 47.68	1.8951	12 3 24.0	10.992
15	7 48 5.49	2.0163	19 30 46.2	7.789	15	9 21 41.33	1.8932	11 52 22.9	11.044
16	7 50 6.38	2.0132	19 22 56.3	7.872	16	9 23 34.87	1.8914	11 41 18.7	11.095
17	7 52 7.08	2.0102	19 15 1.5	7.955	17	9 25 28.30	1.8896	11 30 11.5	11.145
18	7 54 7.60	2.0072	19 7 1.7	8.038	18	9 27 21.62	1.8878	11 19 1.3	11.194
19	7 56 7.94	2.0042	18 58 56.9	8.121	19	9 29 14.84	1.8862	11 7 48.2	11.242
20	7 58 8.11	2.0012	18 50 47.2	8.202	20	9 31 7.96	1.8845	10 56 32.2	11.290
21	8 0 8.09	1.9982	18 42 32.7	8.282	21	9 33 0.98	1.8828	10 45 13.4	11.337
22	8 2 7.89	1.9953	18 34 13.4	8.362	22	9 34 53.90	1.8812	10 33 51.8	11.382
23	8 4 7.52	1.9924	N. 18 25 49.3	8.441	23	9 36 46.73	1.8797	N. 10 22 27.5	11.426
WEDNESDAY 22.					FRIDAY 24.				
0	8 6 6.98	1.9895	N. 18 17 20.5	8.519	0	9 38 39.46	1.8782	N. 10 11 0.4	11.473
1	8 8 6.26	1.9865	18 8 47.0	8.597	1	9 40 32.11	1.8767	9 59 30.7	11.517
2	8 10 5.36	1.9836	18 0 8.8	8.675	2	9 42 24.67	1.8753	9 47 58.3	11.562
3	8 12 4.29	1.9807	17 51 26.0	8.752	3	9 44 17.15	1.8739	9 36 23.3	11.604
4	8 14 3.04	1.9777	17 42 38.6	8.827	4	9 46 9.54	1.8726	9 24 45.8	11.646
5	8 16 1.62	1.9749	17 33 46.7	8.902	5	9 48 1.86	1.8713	9 13 5.8	11.687
6	8 18 0.03	1.9722	17 24 50.3	8.977	6	9 49 54.10	1.8701	9 1 23.4	11.727
7	8 19 58.28	1.9693	17 15 49.5	9.051	7	9 51 46.27	1.8688	8 49 38.6	11.767
8	8 21 56.35	1.9665	17 6 44.2	9.124	8	9 53 38.36	1.8677	8 37 51.4	11.806
9	8 23 54.26	1.9637	16 57 34.6	9.196	9	9 55 30.39	1.8667	8 26 1.9	11.844
10	8 25 52.00	1.9609	16 48 20.7	9.267	10	9 57 22.36	1.8656	8 14 10.1	11.882
11	8 27 49.57	1.9582	16 39 2.5	9.339	11	9 59 14.26	1.8645	8 2 16.1	11.918
12	8 29 46.98	1.9555	16 29 40.0	9.410	12	10 1 6.10	1.8636	7 50 19.9	11.954
13	8 31 44.23	1.9528	16 20 13.3	9.479	13	10 2 57.89	1.8627	7 38 21.6	11.989
14	8 33 41.32	1.9502	16 10 42.5	9.547	14	10 4 49.62	1.8617	7 26 21.2	12.024
15	8 35 38.25	1.9475	16 1 7.6	9.616	15	10 6 41.29	1.8608	7 14 18.7	12.058
16	8 37 35.02	1.9449	15 51 28.6	9.684	16	10 8 32.92	1.8602	7 2 14.2	12.091
17	8 39 31.64	1.9424	15 41 45.5	9.752	17	10 10 24.51	1.8594	6 50 7.8	12.123
18	8 41 28.11	1.9398	15 31 58.4	9.817	18	10 12 16.05	1.8587	6 37 59.4	12.155
19	8 43 24.42	1.9372	15 22 7.4	9.882	19	10 14 7.56	1.8581	6 25 49.2	12.185
20	8 45 20.57	1.9347	15 12 12.5	9.947	20	10 15 59.02	1.8574	6 13 37.2	12.215
21	8 47 16.58	1.9322	15 2 13.8	10.011	21	10 17 50.45	1.8569	6 1 23.4	12.245
22	8 49 12.44	1.9298	14 52 11.2	10.075	22	10 19 41.85	1.8565	5 49 7.8	12.273
23	8 51 8.16	1.9274	14 42 4.8	10.137	23	10 21 33.23	1.8561	5 36 50.6	12.300
24	8 53 3.73	1.9250	N. 14 31 54.7	10.199	24	10 23 24.58	1.8557	N. 5 24 31.8	12.327



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 25.					MONDAY 27.				
0	10 23 24.58	1.8557	N. 5 24 31.8	12.327	0	11 53 2.10	1.8998	S. 4 43 29.5	12.694
1	10 25 15.91	1.8553	5 12 11.3	12.354	1	11 54 56.16	1.9022	4 56 10.8	12.682
2	10 27 7.22	1.8550	4 59 49.3	12.379	2	11 56 50.36	1.9045	5 8 51.3	12.667
3	10 28 58.51	1.8548	4 47 25.8	12.404	3	11 58 44.70	1.9069	5 21 30.9	12.652
4	10 30 49.80	1.8547	4 35 0.8	12.428	4	12 0 39.19	1.9094	5 34 9.6	12.637
5	10 32 41.07	1.8544	4 22 34.4	12.452	5	12 2 33.83	1.9119	5 46 47.4	12.622
6	10 34 32.33	1.8543	4 10 6.6	12.474	6	12 4 28.62	1.9145	5 59 24.2	12.604
7	10 36 23.59	1.8543	3 57 37.5	12.496	7	12 6 23.57	1.9172	6 11 59.9	12.585
8	10 38 14.85	1.8544	3 45 7.1	12.517	8	12 8 18.68	1.9199	6 24 34.4	12.566
9	10 40 6.12	1.8545	3 32 35.5	12.537	9	12 10 13.96	1.9227	6 37 7.8	12.546
10	10 41 57.39	1.8545	3 20 2.6	12.557	10	12 12 9.40	1.9254	6 49 39.9	12.524
11	10 43 48.66	1.8547	3 7 28.7	12.574	11	12 14 5.01	1.9283	7 2 10.7	12.502
12	10 45 39.95	1.8550	2 54 53.7	12.592	12	12 16 0.80	1.9312	7 14 40.2	12.480
13	10 47 31.26	1.8552	2 42 17.6	12.610	13	12 17 56.76	1.9342	7 27 8.3	12.457
14	10 49 22.58	1.8555	2 29 40.5	12.626	14	12 19 52.91	1.9373	7 39 35.0	12.432
15	10 51 13.92	1.8559	2 17 2.5	12.642	15	12 21 49.24	1.9405	7 52 0.1	12.405
16	10 53 5.29	1.8564	2 4 23.5	12.657	16	12 23 45.75	1.9435	8 4 23.6	12.379
17	10 54 56.69	1.8569	1 51 43.7	12.670	17	12 25 42.46	1.9467	8 16 45.6	12.352
18	10 56 48.12	1.8575	1 39 3.1	12.683	18	12 27 39.36	1.9500	8 29 5.8	12.322
19	10 58 39.59	1.8581	1 26 21.7	12.696	19	12 29 36.46	1.9533	8 41 24.3	12.293
20	11 0 31.09	1.8587	1 13 39.6	12.707	20	12 31 33.76	1.9567	8 53 41.0	12.263
21	11 2 22.63	1.8594	1 0 56.9	12.717	21	12 33 31.27	1.9602	9 5 55.9	12.232
22	11 4 14.22	1.8602	0 48 13.5	12.727	22	12 35 28.98	1.9637	9 18 8.8	12.199
23	11 6 5.86	1.8610	N. 0 35 29.6	12.736	23	12 37 26.91	1.9672	S. 9 30 19.8	12.166
SUNDAY 26.					TUESDAY 28.				
0	11 7 57.54	1.8618	N. 0 22 45.2	12.744	0	12 39 25.04	1.9707	S. 9 42 28.7	12.131
1	11 9 49.28	1.8628	N. 0 10 0.3	12.752	1	12 41 23.40	1.9744	9 54 35.5	12.096
2	11 11 41.08	1.8638	S. 0 2 45.1	12.759	2	12 43 21.97	1.9781	10 6 40.2	12.059
3	11 13 32.94	1.8649	0 15 30.8	12.765	3	12 45 20.77	1.9819	10 18 42.6	12.022
4	11 15 24.87	1.8660	0 28 16.9	12.770	4	12 47 19.80	1.9857	10 30 42.8	11.983
5	11 17 16.86	1.8671	0 41 3.2	12.774	5	12 49 19.06	1.9897	10 42 40.6	11.943
6	11 19 8.92	1.8683	0 53 49.8	12.777	6	12 51 18.56	1.9936	10 54 36.0	11.903
7	11 21 1.06	1.8697	1 6 36.5	12.780	7	12 53 18.29	1.9975	11 6 29.0	11.862
8	11 22 53.28	1.8710	1 19 23.4	12.782	8	12 55 18.26	2.0016	11 18 19.4	11.818
9	11 24 45.58	1.8723	1 32 10.3	12.782	9	12 57 18.48	2.0057	11 30 7.2	11.775
10	11 26 37.96	1.8738	1 44 57.3	12.782	10	12 59 18.94	2.0098	11 41 52.4	11.731
11	11 28 30.43	1.8752	1 57 44.2	12.782	11	13 1 19.65	2.0140	11 53 34.9	11.686
12	11 30 22.99	1.8768	2 10 31.1	12.781	12	13 3 20.62	2.0182	12 5 14.7	11.639
13	11 32 15.65	1.8784	2 23 17.9	12.778	13	13 5 21.84	2.0225	12 16 51.6	11.591
14	11 34 8.40	1.8801	2 36 4.5	12.774	14	13 7 23.32	2.0268	12 28 25.6	11.542
15	11 36 1.26	1.8818	2 48 50.8	12.770	15	13 9 25.06	2.0312	12 39 56.7	11.492
16	11 37 54.22	1.8836	3 1 36.9	12.766	16	13 11 27.07	2.0357	12 51 24.7	11.441
17	11 39 47.29	1.8854	3 14 22.7	12.760	17	13 13 29.35	2.0402	13 2 49.6	11.389
18	11 41 40.47	1.8873	3 27 8.1	12.752	18	13 15 31.89	2.0447	13 14 11.4	11.336
19	11 43 33.77	1.8893	3 39 53.0	12.745	19	13 17 34.71	2.0493	13 25 29.9	11.282
20	11 45 27.19	1.8913	3 52 37.5	12.737	20	13 19 37.81	2.0539	13 36 45.2	11.227
21	11 47 20.73	1.8933	4 5 21.5	12.727	21	13 21 41.18	2.0586	13 47 57.2	11.171
22	11 49 14.39	1.8954	4 18 4.8	12.717	22	13 23 44.84	2.0633	13 59 5.7	11.113
23	11 51 8.18	1.8976	4 30 47.5	12.706	23	13 25 48.78	2.0680	14 10 10.8	11.055
24	11 53 2.10	1.8998	S. 4 43 29.5	12.694	24	13 27 53.00	2.0728	S. 14 21 12.3	11.005

GREENWICH MEAN TIME.

## PHASES OF THE MOON.

	d	h	m
☾ Last Quarter . . . . . Feb.	3	5	24.4
● New Moon . . . . .	9	21	31.7
☽ First Quarter . . . . .	16	20	52.0
○ Full Moon . . . . .	25	2	15.8

( Perigee . . . . .	Feb.	d 9	h 2.3
( Apogee . . . . .		27	13.8

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Pollux W.	84 38 57	2829	86 12 47	2818	87 46 52	2806	89 21 12	2794
	MARS W.	82 34 5	2701	84 10 44	2689	85 47 38	2679	87 24 46	2667
	Regulus W.	47 38 58	2811	49 13 11	2798	50 47 41	2786	52 22 27	2773
	Antares E.	52 20 25	2792	50 45 46	2781	49 10 53	2769	47 35 45	2757
	SATURN E.	65 18 36	2825	63 44 40	2813	62 10 29	2801	60 36 3	2789
	VENUS E.	70 44 59	3137	69 17 34	3125	67 49 55	3113	66 22 1	3101
	SUN E.	116 31 41	3157	115 4 40	3144	113 37 24	3132	112 9 53	3119
2	MARS W.	95 34 25	2607	97 13 11	2594	98 52 14	2581	100 31 35	2568
	Regulus W.	60 20 38	2705	61 57 11	2692	63 34 2	2678	65 11 12	2663
	Antares E.	39 36 3	2695	37 59 16	2682	36 22 12	2669	34 44 50	2655
	SATURN E.	52 39 52	2726	51 3 47	2713	49 27 25	2700	47 50 45	2686
	VENUS E.	58 58 42	3035	57 29 13	3022	55 59 27	3007	54 29 23	2993
	SUN E.	104 48 11	3049	103 18 59	3034	101 49 28	3019	100 19 39	3004
3	Regulus W.	73 22 3	2588	75 1 15	2572	76 40 49	2556	78 20 44	2540
	SATURN E.	39 42 42	2615	38 4 8	2601	36 25 14	2586	34 46 0	2572
	VENUS E.	46 54 35	2920	45 22 41	2905	43 50 28	2890	42 17 56	2874
	SUN E.	92 45 42	2924	91 13 54	2908	89 41 45	2891	88 9 14	2874
4	Regulus W.	86 45 56	2459	88 28 7	2443	90 10 41	2426	91 53 38	2410
	Spica W.	32 43 13	2465	34 25 15	2447	36 7 43	2429	37 50 36	2412
	VENUS E.	34 30 27	2801	32 56 0	2787	31 21 15	2773	29 46 12	2761
	SUN E.	80 21 10	2788	78 46 26	2769	77 11 18	2752	75 35 47	2735
5	Spica W.	46 31 16	2325	48 16 39	2309	50 2 26	2292	51 48 37	2275
	JUPITER W.	29 33 44	2417	31 16 55	2392	33 0 41	2369	34 45 0	2348
	SUN E.	67 32 23	2647	65 54 32	2629	64 16 17	2612	62 37 39	2596
6	Spica W.	60 45 33	2196	62 34 6	2182	64 23 1	2168	66 12 17	2153
	JUPITER W.	43 34 9	2249	45 21 23	2232	47 9 3	2216	48 57 7	2199
	SUN E.	54 18 52	2515	52 38 0	2501	50 56 48	2487	49 15 16	2472
7	Spica W.	75 23 46	2090	77 15 0	2079	79 6 32	2068	80 58 21	2058
	JUPITER W.	58 3 16	2128	59 53 33	2116	61 44 8	2104	63 35 1	2093
	Antares W.	29 47 15	2094	31 38 24	2082	33 29 51	2070	35 21 36	2059
	SUN E.	40 42 49	2410	38 59 29	2400	37 15 54	2390	35 32 5	2382
8	Spica W.	90 20 59	2017	92 14 7	2011	94 7 24	2005	96 0 50	2001
	JUPITER W.	72 53 20	2048	74 45 39	2041	76 38 9	2035	78 30 48	2030
	Antares W.	44 44 11	2016	46 37 20	2010	48 30 39	2004	50 24 7	2000
	SATURN W.	31 16 35	2053	33 8 46	2045	35 1 10	2038	36 53 45	2032
	SUN E.	26 50 26	2356	25 5 48	2355	23 21 9	2357	21 36 33	2363
11	SUN W.	16 7 14	2477	17 48 59	2472	19 30 51	2473	21 12 42	2477
	α Arietis E.	57 53 42	2099	56 2 41	2113	54 12 1	2126	52 21 42	2140
	Aldebaran E.	90 43 3	2115	88 52 24	2126	87 2 4	2138	85 12 3	2151
12	SUN W.	29 39 32	2527	31 20 7	2541	33 0 23	2556	34 40 18	2572
	α Arietis E.	43 15 55	2225	41 28 4	2243	39 40 41	2264	37 53 48	2284
	Aldebaran E.	76 7 11	2226	74 19 22	2243	72 31 58	2260	70 45 0	2277
	MARS E.	117 20 56	2148	115 31 10	2164	113 41 48	2179	111 52 49	2196

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Pollux W.	90 55 48	2782	92 30 40	2769	94 5 48	2756	95 41 13	2744
	MARS W.	89 2 10	2655	90 39 50	2644	92 17 45	2632	93 55 56	2619
	Regulus W.	53 57 30	2760	55 32 50	2747	57 8 28	2733	58 44 24	2719
	Antares E.	46 0 21	2745	44 24 41	2733	42 48 45	2720	41 12 32	2708
	SATURN E.	59 1 21	2778	57 26 24	2765	55 51 10	2753	54 15 40	2739
	VENUS E.	64 53 53	3088	63 25 29	3076	61 56 50	3062	60 27 54	3049
	SUN E.	110 42 6	3105	109 14 3	3091	107 45 43	3078	106 17 6	3065
2	MARS W.	102 11 14	2554	103 51 12	2541	105 31 28	2527	107 12 3	2513
	Regulus W.	66 48 42	2648	68 26 32	2633	70 4 42	2618	71 43 12	2603
	Antares E.	33 7 10	2642	31 29 12	2628	29 50 55	2615	28 12 20	2600
	SATURN E.	46 13 46	2672	44 36 28	2658	42 58 52	2644	41 20 57	2629
	VENUS E.	52 59 2	2979	51 28 23	2964	49 57 25	2950	48 26 9	2935
	SUN E.	98 49 31	2989	97 19 4	2973	95 48 17	2957	94 17 10	2940
3	Regulus W.	80 1 2	2524	81 41 42	2508	83 22 44	2492	85 4 9	2476
	SATURN E.	33 6 26	2557	31 26 32	2543	29 46 19	2529	28 5 46	2515
	VENUS E.	40 45 4	2860	39 11 54	2845	37 38 24	2830	36 4 35	2815
	SUN E.	86 36 22	2857	85 3 8	2839	83 29 31	2822	81 55 32	2805
4	Regulus W.	93 36 59	2394	95 20 43	2377	97 4 51	2361	98 49 22	2344
	Spica W.	39 33 54	2394	41 17 37	2377	43 1 45	2359	44 46 18	2342
	VENUS E.	28 10 53	2749	26 35 18	2739	24 59 30	2731	23 23 31	2722
	SUN E.	73 59 53	2717	72 23 36	2699	70 46 55	2682	69 9 51	2664
5	Spica W.	53 35 13	2259	55 22 13	2243	57 9 36	2227	58 57 23	2212
	JUPITER W.	36 29 50	2326	38 15 11	2306	40 1 2	2286	41 47 22	2268
	SUN E.	60 58 39	2580	59 19 16	2565	57 39 30	2547	55 59 22	2531
6	Spica W.	68 1 55	2140	69 51 53	2126	71 42 12	2114	73 32 50	2102
	JUPITER W.	50 45 36	2184	52 34 28	2169	54 23 43	2155	56 13 19	2141
	SUN E.	47 33 23	2458	45 51 11	2445	44 8 41	2433	42 25 53	2422
7	Spica W.	82 50 25	2048	84 42 44	2039	86 35 17	2032	88 28 2	2024
	JUPITER W.	65 26 11	2083	67 17 37	2073	69 9 18	2064	71 1 13	2056
	Antares W.	37 13 38	2049	39 5 56	2040	40 58 28	2032	42 51 13	2023
	SUN E.	33 48 4	2374	32 3 52	2367	30 19 30	2362	28 35 1	2358
8	Spica W.	97 54 23	1997	99 48 2	1993	101 41 47	1991	103 35 35	1989
	JUPITER W.	80 23 35	2026	82 16 29	2023	84 9 28	2020	86 2 31	2017
	Antares W.	52 17 42	1995	54 11 24	1991	56 5 12	1989	57 59 4	1987
	SATURN W.	38 46 29	2027	40 39 21	2023	42 32 20	2019	44 25 24	2016
	SUN E.	19 52 5	2372	18 7 50	2364	16 23 53	2405	14 40 23	2432
11	SUN W.	22 54 27	2484	24 36 3	2492	26 17 28	2502	27 58 38	2514
	α Arietis E.	50 31 44	2155	48 42 9	2172	46 52 59	2188	45 4 14	2206
	Aldebaran E.	83 22 21	2165	81 33 0	2179	79 44 1	2194	77 55 24	2210
12	SUN W.	36 19 51	2589	37 59 1	2606	39 37 48	2624	41 16 11	2642
	α Arietis E.	36 7 25	2307	34 21 35	2329	32 36 18	2354	30 51 37	2380
	Aldebaran E.	68 58 27	2296	67 12 21	2315	65 26 43	2334	63 41 33	2353
	MARS E.	110 4 15	2212	108 16 6	2230	106 28 23	2247	104 41 6	2265

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
13	SUN W.	42 54 9	2660	44 31 43	2679	46 8 51	2698	47 45 33	2717
	Aldebaran E.	61 56 51	2373	60 12 38	2394	58 28 54	2415	56 45 40	2435
	MARS E.	102 54 15	2283	101 7 51	2302	99 21 55	2320	97 36 25	2339
	Pollux E.	103 47 32	2362	102 3 3	2380	100 18 59	2398	98 35 21	2417
14	SUN W.	55 42 33	2818	57 16 38	2838	58 50 17	2859	60 23 29	2878
	Aldebaran E.	48 17 6	2547	46 36 58	2571	44 57 23	2594	43 18 20	2619
	MARS E.	88 55 49	2435	87 13 4	2455	85 30 47	2474	83 48 57	2494
	Pollux E.	90 3 50	2511	88 22 52	2530	86 42 20	2549	85 2 15	2568
15	SUN W.	68 3 8	2977	69 33 49	2997	71 4 5	3017	72 33 57	3036
	α Pegasi W.	44 0 2	2911	45 32 7	2913	47 4 9	2916	48 36 8	2920
	Aldebaran E.	35 11 45	2753	33 36 16	2784	32 1 27	2815	30 27 19	2849
	MARS E.	75 26 32	2589	73 47 22	2607	72 8 37	2626	70 30 17	2645
	Pollux E.	76 48 24	2664	75 10 56	2683	73 33 53	2701	71 57 15	2719
16	SUN W.	79 57 30	3127	81 25 7	3144	82 52 23	3162	84 19 18	3178
	α Pegasi W.	56 14 4	2958	57 45 9	2967	59 16 3	2977	60 46 45	2986
	MARS E.	62 24 47	2733	60 48 51	2750	59 13 18	2767	57 38 7	2783
	Pollux E.	64 0 7	2810	62 25 52	2828	60 52 0	2845	59 18 30	2862
	Regulus E.	100 48 12	2771	99 13 6	2787	97 38 21	2802	96 3 56	2818
17	SUN W.	91 29 9	3255	92 54 13	3269	94 19 1	3282	95 43 33	3296
	α Pegasi W.	68 17 13	3035	69 46 42	3045	71 15 59	3055	72 45 4	3064
	α Arietis W.	24 40 50	2984	26 11 23	2985	27 41 54	2989	29 12 21	2992
	MARS E.	49 47 24	2861	48 14 15	2876	46 41 26	2891	45 8 55	2905
	Pollux E.	51 36 26	2945	50 5 4	2961	48 34 2	2977	47 3 20	2993
	Regulus E.	88 16 37	2888	86 44 3	2901	85 11 45	2913	83 39 43	2926
18	SUN W.	102 42 31	3355	104 5 39	3366	105 28 34	3376	106 51 18	3386
	α Pegasi W.	80 7 39	3109	81 35 38	3118	83 3 26	3126	84 31 4	3133
	α Arietis W.	36 43 10	3020	38 12 58	3026	39 42 39	3032	41 12 12	3038
	MARS E.	37 30 47	2973	36 0 1	2986	34 29 31	3000	32 59 18	3014
	Pollux E.	39 34 52	3074	38 6 11	3091	36 37 51	3109	35 9 52	3127
	Regulus E.	76 3 15	2920	74 32 37	2990	73 2 12	2999	71 31 58	3008
19	SUN W.	113 42 21	3427	115 4 7	3434	116 25 45	3441	117 47 15	3446
	α Pegasi W.	91 46 58	3170	93 13 43	3176	94 40 21	3182	96 6 52	3188
	α Arietis W.	48 38 14	3064	50 7 8	3069	51 35 56	3073	53 4 38	3077
	Regulus E.	64 3 24	3047	62 34 9	3052	61 5 1	3059	59 36 1	3065
20	SUN W.	124 33 15	3471	125 54 12	3475	127 15 4	3479	128 35 52	3481
	α Arietis W.	60 27 6	3092	61 55 25	3094	63 23 42	3096	64 51 56	3097
	Aldebaran W.	28 21 12	3219	29 46 23	3236	31 11 49	3245	32 37 28	3244
	Regulus E.	52 12 39	3088	50 44 15	3091	49 15 55	3095	47 47 39	3098
	Spica E.	106 12 29	3072	104 43 45	3075	103 15 5	3078	101 46 28	3079
21	α Arietis W.	72 12 50	3101	73 40 59	3100	75 9 9	3099	76 37 20	3098
	Aldebaran W.	39 48 20	3178	41 14 55	3173	42 41 36	3168	44 8 24	3162
	Regulus E.	40 27 11	3110	38 59 14	3113	37 31 20	3114	36 3 28	3117
	Spica E.	94 23 49	3084	92 55 20	3083	91 26 50	3083	89 58 20	3083
	JUPITER E.	112 12 16	3105	110 44 13	3105	109 16 9	3104	107 48 4	3103

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
13	SUN W.	49 21 50	2738	50 57 40	2757	52 33 4	2777	54 8 2	2798
	Aldebaran E.	55 2 55	2457	53 20 41	2479	51 38 58	2501	49 57 46	2524
	MARS E.	95 51 23	2358	94 6 48	2378	92 22 41	2396	90 39 1	2416
	Pollux E.	96 52 10	2435	95 9 25	2454	93 27 7	2472	91 45 15	2492
14	SUN W.	61 56 16	2898	63 28 37	2919	65 0 32	2939	66 32 2	2958
	Aldebaran E.	41 39 51	2644	40 1 56	2670	38 24 36	2697	36 47 52	2725
	MARS E.	82 7 35	2513	80 26 40	2532	78 46 11	2551	77 6 8	2570
	Pollux E.	83 22 36	2588	81 43 24	2607	80 4 38	2626	78 26 18	2645
15	SUN W.	74 3 25	3055	75 32 30	3073	77 1 12	3091	78 29 32	3110
	α Pegasi W.	50 8 1	2927	51 39 46	2934	53 11 22	2942	54 42 48	2950
	Aldebaran E.	28 53 55	2885	27 21 17	2925	25 49 30	2969	24 18 38	3018
	MARS E.	68 52 23	2663	67 14 53	2681	65 37 48	2698	64 1 6	2716
	Pollux E.	70 21 1	2738	68 45 12	2756	67 9 47	2774	65 34 45	2792
16	SUN W.	85 45 54	3194	87 12 10	3209	88 38 8	3225	90 3 47	3240
	α Pegasi W.	62 17 15	2996	63 47 33	3005	65 17 39	3016	66 47 32	3026
	MARS E.	56 3 17	2799	54 28 48	2815	52 54 40	2831	51 20 52	2846
	Pollux E.	57 45 22	2879	56 12 36	2896	54 40 12	2912	53 8 9	2928
	Regulus E.	94 29 51	2832	92 56 5	2847	91 22 38	2861	89 49 29	2874
17	SUN W.	97 7 49	3308	98 31 51	3321	99 55 38	3333	101 19 11	3345
	α Pegasi W.	74 13 58	3073	75 42 40	3082	77 11 11	3092	78 39 30	3101
	α Arietis W.	30 42 44	2997	32 13 1	3002	33 43 11	3008	35 13 14	3014
	MARS E.	43 36 42	2919	42 4 47	2933	40 33 10	2946	39 1 50	2960
	Pollux E.	45 32 59	3009	44 2 57	3025	42 33 15	3041	41 3 53	3058
	Regulus E.	82 7 57	2938	80 36 26	2949	79 5 9	2959	77 34 5	2970
18	SUN W.	108 13 50	3395	109 36 12	3404	110 58 24	3412	112 20 27	3420
	α Pegasi W.	85 58 33	3141	87 25 53	3149	88 53 3	3156	90 20 5	3163
	α Arietis W.	42 41 38	3043	44 10 57	3049	45 40 9	3054	47 9 15	3060
	MARS E.	31 29 23	3028	29 59 45	3042	28 30 24	3057	27 1 22	3072
	Pollux E.	33 42 15	3146	32 15 1	3166	30 48 11	3188	29 21 47	3213
	Regulus E.	70 1 55	3026	68 32 2	3025	67 2 20	3033	65 32 48	3039
19	SUN W.	119 8 39	3433	120 29 56	3457	121 51 8	3463	123 12 14	3467
	α Pegasi W.	97 33 15	3194	98 59 31	3199	100 25 41	3205	101 51 44	3209
	α Arietis W.	54 33 16	3081	56 1 49	3084	57 30 18	3087	58 58 44	3090
	Regulus E.	58 7 9	3070	56 38 23	3075	55 9 43	3079	53 41 8	3084
20	SUN W.	129 56 37	3484	131 17 19	3487	132 37 58	3488	133 58 35	3489
	α Arietis W.	66 20 9	3099	67 48 20	3099	69 16 31	3100	70 44 41	3101
	Aldebaran W.	34 3 20	3206	35 29 22	3198	36 55 33	3191	38 21 53	3185
	Regulus E.	46 19 27	3101	44 51 18	3104	43 23 13	3106	41 55 11	3108
	Spica E.	100 17 53	3081	98 49 20	3082	97 20 49	3083	95 52 19	3083
21	α Arietis W.	78 5 32	3096	79 33 46	3096	81 2 1	3094	82 30 18	3091
	Aldebaran W.	45 35 19	3157	47 2 20	3152	48 29 27	3147	49 56 40	3142
	Regulus E.	34 35 39	3119	33 7 52	3121	31 40 8	3123	30 12 26	3126
	Spica E.	88 29 50	3082	87 1 18	3081	85 32 45	3079	84 4 10	3077
	JUPITER E.	106 19 58	3101	104 51 50	3099	103 23 39	3097	101 55 26	3096

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
22	$\alpha$ Arietis W.	83 58 38	3089	85 27 1	3087	86 55 26	3085	88 23 54	3082
	Aldebaran W.	51 23 59	3137	52 51 24	3132	54 18 55	3127	55 46 32	3121
	Regulus E.	28 44 48	3129	27 17 14	3133	25 49 44	3138	24 22 20	3144
	Spica E.	82 35 32	3075	81 6 52	3073	79 38 9	3070	78 9 23	3068
	JUPITER E.	100 27 11	3093	98 58 53	3090	97 30 31	3087	96 2 5	3084
23	$\alpha$ Arietis W.	95 47 14	3065	97 16 7	3060	98 45 5	3056	100 14 8	3052
	Aldebaran W.	63 6 12	3096	64 34 27	3091	66 2 48	3085	67 31 16	3079
	MARS W.	23 6 2	3129	24 33 36	3114	26 1 28	3102	27 29 35	3091
	Spica E.	70 44 37	3051	69 15 27	3046	67 46 11	3042	66 16 50	3038
	JUPITER E.	88 38 57	3065	87 10 5	3061	85 41 8	3057	84 12 6	3052
	Antares E.	116 20 49	3047	114 51 35	3043	113 22 16	3039	111 52 52	3034
24	$\alpha$ Arietis W.	107 40 46	3029	109 10 23	3024	110 40 6	3018	112 9 56	3014
	Aldebaran W.	74 55 21	3050	76 24 32	3044	77 53 50	3039	79 23 15	3032
	MARS W.	34 53 25	3043	36 22 44	3034	37 52 14	3027	39 21 53	3019
	Pollux W.	33 20 12	3143	34 47 29	3128	36 15 5	3114	37 42 58	3100
	Spica E.	58 48 42	3014	57 18 47	3009	55 48 45	3003	54 18 36	2998
	JUPITER E.	76 45 27	3028	75 15 49	3022	73 46 4	3017	72 16 12	3012
	Antares E.	104 24 22	3009	102 54 21	3004	101 24 13	2998	99 53 58	2993
25	Aldebaran W.	86 52 16	3001	88 22 27	2994	89 52 47	2989	91 23 14	2981
	MARS W.	46 52 30	2982	48 23 5	2976	49 53 48	2969	51 24 40	2962
	Pollux W.	45 6 14	3042	46 35 35	3032	48 5 8	3022	49 34 53	3012
	Spica E.	46 46 11	2970	45 15 21	2964	43 44 23	2958	42 13 18	2953
	JUPITER E.	64 45 12	2984	63 14 39	2977	61 43 58	2973	60 13 11	2966
	Antares E.	92 20 56	2962	90 49 56	2957	89 18 49	2950	87 47 34	2944
	SATURN E.	107 2 9	2985	105 31 38	2979	104 0 59	2973	102 30 12	2965
26	Aldebaran W.	98 57 35	2949	100 28 52	2942	102 0 17	2936	103 31 50	2929
	MARS W.	59 1 15	2926	60 33 1	2919	62 4 56	2912	63 37 0	2905
	Pollux W.	57 6 39	2966	58 37 34	2957	60 8 41	2949	61 39 58	2939
	Spica E.	34 36 5	2924	33 4 17	2918	31 32 21	2913	30 0 19	2908
	JUPITER E.	52 37 24	2938	51 5 53	2931	49 34 14	2926	48 2 28	2921
	Antares E.	80 9 13	2910	78 37 7	2903	77 4 52	2896	75 32 28	2889
	SATURN E.	94 54 7	2931	93 22 28	2924	91 50 39	2917	90 18 42	2909
27	MARS W.	71 19 37	2868	72 52 37	2861	74 25 46	2853	75 59 5	2846
	Pollux W.	69 19 11	2897	70 51 34	2888	72 24 8	2880	73 56 53	2872
	Regulus W.	32 16 53	2893	33 49 21	2882	35 22 3	2872	36 54 58	2861
	JUPITER E.	40 22 0	2896	38 49 36	2891	37 17 6	2888	35 44 32	2885
	Antares E.	67 48 11	2852	66 14 51	2845	64 41 22	2837	63 7 42	2830
	SATURN E.	82 36 35	2873	81 3 41	2865	79 30 37	2857	77 57 23	2849
	VENUS E.	112 29 31	3242	111 4 12	3235	109 38 44	3226	108 13 6	3218
28	MARS W.	83 48 5	2808	85 22 23	2799	86 56 52	2792	88 31 31	2784
	Pollux W.	81 43 19	2828	83 17 10	2821	84 51 11	2812	86 25 23	2803
	Regulus W.	44 42 52	2811	46 17 5	2802	47 51 30	2792	49 26 8	2783
	Antares E.	55 16 55	2791	53 42 15	2782	52 7 24	2774	50 32 22	2766
	SATURN E.	70 8 39	2808	68 34 22	2801	66 59 55	2792	65 25 17	2784
	VENUS E.	101 2 24	3174	99 35 44	3166	98 8 54	3157	96 41 53	3147
	$\alpha$ Aquilæ E.	107 41 18	3346	106 18 0	3329	104 54 22	3313	103 30 25	3297

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	$\alpha$ Arietis W.	89 52 26	3079	91 21 1	3075	92 49 41	3072	94 18 25	3068
	Aldebaran W.	57 14 16	3117	58 42 5	3111	60 10 1	3106	61 38 3	3101
	Regulus E.	22 55 4	3152	21 27 57	3162	20 1 2	3174	18 34 22	3190
	Spica E.	76 40 34	3065	75 11 41	3061	73 42 44	3058	72 13 43	3054
	JUPITER E.	94 33 36	3081	93 5 3	3078	91 36 26	3073	90 7 44	3069
23	$\alpha$ Arietis W.	101 43 17	3047	103 12 31	3043	104 41 50	3039	106 11 15	3034
	Aldebaran W.	68 59 51	3073	70 28 33	3063	71 57 22	3062	73 26 18	3056
	MARS W.	28 57 56	3080	30 26 30	3069	31 55 17	3060	33 24 16	3052
	Spica E.	64 47 24	3033	63 17 52	3029	61 48 15	3024	60 18 32	3018
	JUPITER E.	82 42 58	3048	81 13 45	3043	79 44 25	3038	78 14 59	3033
	Antares E.	110 23 22	3030	108 53 46	3025	107 24 4	3020	105 54 16	3015
24	$\alpha$ Arietis W.	113 39 52	3009	115 9 54	3003	116 40 3	2997	118 10 19	2993
	Aldebaran W.	80 52 48	3026	82 22 29	3020	83 52 17	3014	85 22 13	3008
	MARS W.	40 51 42	3012	42 21 40	3004	43 51 48	2997	45 22 4	2989
	Pollux W.	39 11 8	3087	40 39 33	3075	42 8 13	3064	43 37 7	3053
	Spica E.	52 48 21	2993	51 17 59	2987	49 47 30	2981	48 16 54	2976
	JUPITER E.	70 46 14	3006	69 16 9	3001	67 45 57	2995	66 15 38	2989
	Antares E.	98 23 37	2987	96 53 8	2981	95 22 32	2975	93 51 48	2969
25	Aldebaran W.	92 53 50	2975	94 24 34	2969	95 55 26	2962	97 26 26	2955
	MARS W.	52 55 41	2954	54 26 51	2947	55 58 10	2940	57 29 38	2933
	Pollux W.	51 4 51	3002	52 35 1	2993	54 5 22	2984	55 35 55	2975
	Spica E.	40 42 6	2947	39 10 47	2941	37 39 20	2935	36 7 46	2930
	JUPITER E.	58 42 16	2961	57 11 14	2955	55 40 5	2949	54 8 48	2943
	Antares E.	86 16 11	2937	84 44 39	2931	83 12 59	2924	81 41 10	2917
	SATURN E.	100 59 16	2959	99 28 12	2952	97 56 59	2945	96 25 37	2939
26	Aldebaran W.	105 3 32	2923	106 35 22	2916	108 7 21	2909	109 39 28	2903
	MARS W.	65 9 13	2898	66 41 35	2891	68 14 6	2883	69 46 47	2876
	Pollux W.	63 11 27	2931	64 43 6	2922	66 14 57	2913	67 46 59	2905
	Spica E.	28 28 10	2903	26 55 55	2898	25 23 34	2894	23 51 8	2891
	JUPITER E.	46 30 36	2916	44 58 37	2910	43 26 31	2905	41 54 19	2900
	Antares E.	73 59 55	2882	72 27 13	2875	70 54 22	2867	69 21 21	2860
	SATURN E.	88 46 35	2902	87 14 19	2895	85 41 54	2887	84 9 19	2880
27	MARS W.	77 32 33	2838	79 6 11	2831	80 39 59	2823	82 13 57	2815
	Pollux W.	75 29 48	2862	77 2 55	2855	78 36 12	2846	80 9 40	2838
	Regulus W.	38 28 7	2851	40 1 29	2841	41 35 4	2831	43 8 52	2821
	JUPITER E.	34 11 54	2883	32 39 13	2880	31 6 29	2879	29 33 43	2877
	Antares E.	61 33 53	2821	59 59 53	2815	58 25 44	2807	56 51 25	2798
	SATURN E.	76 23 59	2842	74 50 25	2833	73 16 40	2825	71 42 45	2817
	VENUS E.	106 47 18	3208	105 21 20	3201	103 55 12	3192	102 28 53	3183
28	MARS W.	90 6 20	2775	91 41 20	2767	93 16 31	2759	94 51 53	2751
	Pollux W.	87 59 47	2795	89 34 22	2785	91 9 9	2777	92 44 7	2769
	Regulus W.	51 0 58	2773	52 36 1	2763	54 11 17	2754	55 46 45	2744
	Antares E.	48 57 9	2758	47 21 46	2749	45 46 11	2741	44 10 25	2732
	SATURN E.	63 50 28	2775	62 15 28	2766	60 40 16	2758	59 4 53	2749
	VENUS E.	95 14 40	3138	93 47 17	3129	92 19 42	3119	90 51 56	3110
	$\alpha$ Aquilæ E.	102 6 10	3222	100 41 37	3267	99 16 47	3254	97 51 42	3241



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Wed.	1	h m s 22 48 51.13	9.358	S. 7 32 57.5	+56.99	16 10.46	65.43	m s 12 31.54	s 0.497
Thur.	2	22 52 35.49	9.338	7 10 6.5	57.25	16 10.21	65.36	12 19.37	0.517
Frid.	3	22 56 19.37	9.319	6 47 9.4	57.50	16 9.96	65.29	12 6.73	0.536
Sat.	4	23 0 2.79	9.301	6 24 6.4	+57.74	16 9.71	65.23	11 53.64	0.554
SUN.	5	23 3 45.79	9.283	6 0 57.9	57.96	16 9.45	65.17	11 40.12	0.572
Mon.	6	23 7 28.36	9.266	5 37 44.5	58.16	16 9.19	65.11	11 26.18	0.589
Tues.	7	23 11 10.54	9.250	5 14 26.4	+58.34	16 8.93	65.05	11 11.84	0.605
Wed.	8	23 14 52.34	9.234	4 51 4.0	58.51	16 8.67	64.99	10 57.13	0.620
Thur.	9	23 18 33.78	9.219	4 27 37.9	58.66	16 8.41	64.93	10 42.06	0.635
Frid.	10	23 22 14.87	9.205	4 4 8.3	+58.79	16 8.15	64.88	10 26.64	0.649
Sat.	11	23 25 55.63	9.192	3 40 35.7	58.91	16 7.88	64.83	10 10.89	0.662
SUN.	12	23 29 36.09	9.179	3 17 0.5	59.01	16 7.62	64.79	9 54.84	0.675
Mon.	13	23 33 16.24	9.167	2 53 23.2	+59.09	16 7.35	64.75	9 38.48	0.687
Tues.	14	23 36 56.12	9.156	2 29 43.9	59.16	16 7.09	64.71	9 21.85	0.698
Wed.	15	23 40 35.73	9.145	2 6 3.3	59.21	16 6.83	64.67	9 4.96	0.709
Thur.	16	23 44 15.10	9.135	1 42 21.7	+59.25	16 6.57	64.64	8 47.82	0.719
Frid.	17	23 47 54.24	9.126	1 18 39.4	59.27	16 6.30	64.61	8 30.46	0.728
Sat.	18	23 51 33.18	9.118	0 54 56.8	59.27	16 6.04	64.59	8 12.89	0.736
SUN.	19	23 55 11.92	9.111	0 31 14.3	+59.26	16 5.77	64.57	7 55.13	0.743
Mon.	20	23 58 50.50	9.105	S. 0 7 32.3	59.24	16 5.50	64.55	7 37.20	0.750
Tues.	21	0 2 28.93	9.099	N. 0 16 9.0	59.20	16 5.23	64.53	7 19.13	0.756
Wed.	22	0 6 7.23	9.094	0 39 49.0	+59.14	16 4.96	64.52	7 0.93	0.761
Thur.	23	0 9 45.43	9.090	1 3 27.6	59.07	16 4.69	64.51	6 42.62	0.764
Frid.	24	0 13 23.54	9.087	1 27 4.4	58.99	16 4.42	64.50	6 24.24	0.767
Sat.	25	0 17 1.60	9.085	1 50 39.0	+58.89	16 4.15	64.49	6 5.79	0.769
SUN.	26	0 20 39.62	9.084	2 14 11.2	58.78	16 3.87	64.49	5 47.31	0.770
Mon.	27	0 24 17.64	9.084	2 37 40.5	58.66	16 3.59	64.49	5 28.82	0.770
Tues.	28	0 27 55.66	9.085	3 1 6.7	+58.52	16 3.31	64.49	5 10.35	0.769
Wed.	29	0 31 33.73	9.089	3 24 29.4	58.37	16 3.03	64.49	4 51.91	0.767
Thur.	30	0 35 11.85	9.091	3 47 48.4	58.21	16 2.75	64.50	4 33.53	0.764
Frid.	31	0 38 50.06	9.094	4 11 3.2	58.03	16 2.47	64.51	4 15.23	0.760
Sat.	32	0 42 28.37	9.099	N. 4 34 13.5	+57.83	16 2.18	64.52	3 57.04	0.755

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.13 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing, north declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Wed.	1	<sup>h</sup> 22 <sup>m</sup> 48 <sup>s</sup> 49.18	<sup>s</sup> 9.360	<sup>°</sup> S. 7 33 9.5	<sup>"</sup> +56.99	<sup>m</sup> 12 <sup>s</sup> 31.64	<sup>s</sup> 0.496	<sup>h</sup> 22 <sup>m</sup> 36 <sup>s</sup> 17.54
Thur.	2	22 52 33.57	9.340	7 10 18.4	57.26	12 19.48	0.516	22 40 14.09
Frid.	3	22 56 17.49	9.320	6 47 21.0	57.51	12 6.84	0.536	22 44 10.64
Sat.	4	23 0 0.95	9.301	6 24 17.9	+57.75	11 53.75	0.555	22 48 7.20
SUN.	5	23 3 43.98	9.284	6 1 9.3	57.97	11 40.23	0.572	22 52 3.75
Mon.	6	23 7 26.60	9.267	5 37 55.6	58.17	11 26.29	0.589	22 56 0.30
Tues.	7	23 11 8.82	9.251	5 14 37.3	+58.35	11 11.96	0.605	22 59 56.86
Wed.	8	23 14 50.66	9.236	4 51 14.8	58.52	10 57.25	0.620	23 3 53.41
Thur.	9	23 18 32.14	9.221	4 27 48.4	58.67	10 42.17	0.635	23 7 49.96
Frid.	10	23 22 13.27	9.207	4 4 18.6	+58.80	10 26.75	0.649	23 11 46.52
Sat.	11	23 25 54.08	9.194	3 40 45.8	58.92	10 11.01	0.663	23 15 43.07
SUN.	12	23 29 34.57	9.181	3 17 10.3	59.02	9 54.95	0.675	23 19 39.62
Mon.	13	23 33 14.77	9.169	2 53 32.7	+59.10	9 38.60	0.687	23 23 36.17
Tues.	14	23 36 54.69	9.158	2 29 53.2	59.17	9 21.96	0.698	23 27 32.73
Wed.	15	23 40 34.35	9.147	2 6 12.3	59.22	9 5.07	0.709	23 31 29.28
Thur.	16	23 44 13.76	9.137	1 42 30.4	+59.26	8 47.93	0.719	23 35 25.83
Frid.	17	23 47 52.95	9.128	1 18 47.8	59.28	8 30.56	0.728	23 39 22.38
Sat.	18	23 51 31.93	9.120	0 55 4.9	59.28	8 12.99	0.736	23 43 18.94
SUN.	19	23 55 10.72	9.113	0 31 22.2	+59.27	7 55.23	0.744	23 47 15.49
Mon.	20	23 58 49.34	9.106	S. 0 7 39.8	59.25	7 37.30	0.750	23 51 12.04
Tues.	21	0 2 27.82	9.100	N. 0 16 1.7	59.21	7 19.22	0.756	23 55 8.60
Wed.	22	0 6 6.17	9.095	0 39 42.1	+59.15	7 1.02	0.761	23 59 5.15
Thur.	23	0 9 44.41	9.092	1 3 21.0	59.08	6 42.71	0.765	0 3 1.70
Frid.	24	0 13 22.57	9.089	1 26 58.1	59.00	6 24.32	0.767	0 6 58.26
Sat.	25	0 17 0.68	9.087	1 50 33.0	+58.90	6 5.87	0.769	0 10 54.81
SUN.	26	0 20 38.75	9.086	2 14 5.5	58.79	5 47.39	0.770	0 14 51.36
Mon.	27	0 24 16.81	9.086	2 37 35.1	58.67	5 28.90	0.770	0 18 47.91
Tues.	28	0 27 54.88	9.087	3 1 1.6	+58.53	5 10.41	0.769	0 22 44.47
Wed.	29	0 31 32.99	9.089	3 24 24.7	58.38	4 51.97	0.767	0 26 41.02
Thur.	30	0 35 11.16	9.092	3 47 44.0	58.22	4 33.59	0.764	0 30 37.57
Frid.	31	0 38 49.41	9.096	4 10 59.0	58.04	4 15.29	0.760	0 34 34.12
Sat.	32	0 42 27.77	9.101	N. 4 34 9.7	+57.84	3 57.09	0.756	0 38 30.68

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing, north declinations increasing.

Diff. for 1 Hour,  
+ 9'.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	60	340 43 19.5	42 53.3	150.40	— 0.43	9.9961959	+46.2	h m s 1 23 28.75
2	61	341 43 28.2	43 1.9	150.33	0.36	9.9963075	46.8	1 19 32.84
3	62	342 43 35.3	43 8.9	150.27	0.26	9.9964205	47.3	1 15 36.93
4	63	343 43 40.9	43 14.4	150.21	— 0.15	9.9965347	+47.8	1 11 41.03
5	64	344 43 45.0	43 18.4	150.14	— 0.03	9.9966500	48.2	1 7 45.12
6	65	345 43 47.5	43 20.8	150.07	+ 0.10	9.9967659	48.5	1 3 49.21
7	66	346 43 48.3	43 21.5	150.00	+ 0.23	9.9968827	+48.7	0 59 53.31
8	67	347 43 47.5	43 20.6	149.93	0.35	9.9969998	48.9	0 55 57.40
9	68	348 43 45.0	43 18.0	149.86	0.46	9.9971175	49.1	0 52 1.49
10	69	349 43 40.7	43 13.6	149.79	+ 0.54	9.9972354	+49.2	0 48 5.58
11	70	350 43 34.6	43 7.4	149.71	0.61	9.9973536	49.3	0 44 9.68
12	71	351 43 26.6	42 59.3	149.63	0.63	9.9974719	49.4	0 40 13.77
13	72	352 43 16.4	42 49.0	149.54	+ 0.64	9.9975902	+49.4	0 36 17.86
14	73	353 43 4.3	42 36.8	149.45	0.61	9.9977086	49.4	0 32 21.96
15	74	354 42 50.1	42 22.5	149.36	0.55	9.9978271	49.4	0 28 26.05
16	75	355 42 33.6	42 5.9	149.27	+ 0.47	9.9979457	+49.5	0 24 30.14
17	76	356 42 15.0	41 47.2	149.17	0.36	9.9980646	49.6	0 20 34.24
18	77	357 41 54.0	41 26.1	149.07	0.24	9.9981838	49.7	0 16 38.33
19	78	358 41 30.8	41 2.8	148.98	+ 0.11	9.9983032	+49.9	0 12 42.42
20	79	359 41 5.3	40 37.2	148.88	— 0.03	9.9984232	50.1	0 8 46.52
21	80	0 40 37.3	40 9.1	148.79	0.16	9.9985437	50.3	0 4 50.61
22	81	1 40 7.2	39 38.9	148.69	— 0.28	9.9986648	+50.6	{ 0 0 54.70 }
23	82	2 39 34.8	39 6.4	148.60	0.38	9.9987866	50.9	23 56 58.79
24	83	3 39 0.1	38 31.6	148.51	0.47	9.9989091	51.2	23 53 2.88
25	84	4 38 23.4	37 54.8	148.42	— 0.52	9.9990325	+51.5	23 49 6.98
26	85	5 37 44.4	37 15.7	148.33	0.55	9.9991565	51.8	23 45 11.07
27	86	6 37 3.4	36 34.6	148.25	0.54	9.9992815	52.2	23 41 15.16
28	87	7 36 20.4	35 51.5	148.17	— 0.51	9.9994070	+52.5	23 37 19.26
29	88	8 35 35.5	35 6.5	148.09	0.44	9.9995333	52.8	23 33 23.35
30	89	9 34 48.7	34 19.6	148.01	0.35	9.9996604	53.0	23 29 27.44
31	90	10 34 0.0	33 30.8	147.93	0.24	9.9997877	53.1	23 25 31.54
32	91	11 33 9.5	32 40.2	147.86	— 0.13	9.9999154	+53.2	23 21 35.63
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9'.8296. (Table II.)

## GREENWICH MEAN TIME

## THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 22.2	15 26.6	56 17.8	+1.31	56 33.9	+1.37	15 21.5	2.06	19.1
2	15 31.2	15 36.0	56 50.8	1.43	57 8.4	1.49	16 12.6	2.21	20.1
3	15 40.9	15 46.0	57 26.6	1.54	57 45.4	1.58	17 7.4	2.35	21.1
4	15 51.3	15 56.5	58 4.6	+1.60	58 24.0	+1.62	18 5.2	2.46	22.1
5	16 1.8	16 7.0	58 43.4	1.60	59 2.4	1.56	19 4.9	2.50	23.1
6	16 12.0	16 16.7	59 20.8	1.48	59 38.1	1.37	20 4.8	2.48	24.1
7	16 21.0	16 24.7	59 53.7	+1.22	60 7.4	+1.03	21 3.4	2.39	25.1
8	16 27.8	16 30.0	60 18.6	0.80	60 26.8	+0.54	21 59.6	2.29	26.1
9	16 31.3	16 31.6	60 31.7	+0.25	60 32.9	-0.06	22 53.6	2.20	27.1
10	16 30.9	16 29.0	60 30.3	-0.38	60 23.7	-0.70	23 45.7	2.14	28.1
11	16 26.3	16 22.5	60 13.3	1.02	59 59.2	1.31	0 6		29.1
12	16 17.7	16 12.2	59 41.8	1.57	59 21.5	1.79	0 36.8	2.12	0.7
13	16 6.0	15 59.4	58 58.8	-1.96	58 34.3	-2.09	1 27.6	2.12	1.7
14	15 52.4	15 45.2	58 8.6	2.17	57 42.3	2.19	2 18.9	2.15	2.7
15	15 38.0	15 31.0	57 15.9	2.18	56 50.1	2.11	3 10.8	2.18	3.7
16	15 24.2	15 17.8	56 25.2	-2.02	56 1.6	-1.89	4 3.2	2.19	4.7
17	15 11.8	15 6.5	55 39.8	1.73	55 20.0	1.55	4 55.6	2.17	5.7
18	15 1.7	14 57.5	55 2.4	1.36	54 47.2	1.16	5 47.2	2.12	6.7
19	14 54.1	14 51.3	54 34.5	-0.95	54 24.4	-0.74	6 37.4	2.05	7.7
20	14 49.2	14 47.9	54 16.8	0.52	54 11.8	-0.31	7 25.5	1.96	8.7
21	14 47.2	14 47.1	54 9.3	-0.11	54 9.1	+0.08	8 11.6	1.88	9.7
22	14 47.7	14 48.9	54 11.3	+0.27	54 15.6	+0.44	8 55.7	1.81	10.7
23	14 50.6	14 52.8	54 21.9	0.60	54 29.9	0.74	9 38.5	1.76	11.7
24	14 55.5	14 58.4	54 39.6	0.86	54 50.6	0.97	10 20.6	1.75	12.7
25	15 1.8	15 5.4	55 2.9	+1.06	55 16.1	+1.13	11 2.8	1.77	13.7
26	15 9.2	15 13.1	55 30.0	1.18	55 44.5	1.22	11 45.9	1.83	14.7
27	15 17.2	15 21.3	55 59.4	1.25	56 14.5	1.26	12 30.9	1.92	15.7
28	15 25.4	15 29.5	56 29.6	+1.25	56 44.7	+1.25	13 18.4	2.05	16.7
29	15 33.6	15 37.5	56 59.6	1.23	57 14.2	1.20	14 9.2	2.19	17.7
30	15 41.4	15 45.3	57 28.5	1.18	57 42.5	1.15	15 3.4	2.32	18.7
31	15 48.9	15 52.5	57 56.0	1.11	58 9.1	1.08	16 0.5	2.42	19.7
32	15 56.0	15 59.3	58 21.8	+1.03	58 34.0	+0.99	16 59.2	2.46	20.7

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 1.					FRIDAY 3.				
0	13 27 53.00	2.0728	S. 14 21 12.3	10.995	0	15 13 32.68	2.3363	S. 21 38 14.8	6.758
1	13 29 57.52	2.0777	14 32 10.2	10.934	1	15 15 53.03	2.3419	21 44 56.8	6.641
2	13 32 2.33	2.0827	14 43 4.4	10.872	2	15 18 13.71	2.3474	21 51 31.7	6.522
3	13 34 7.44	2.0876	14 53 54.8	10.808	3	15 20 34.72	2.3530	21 57 59.4	6.402
4	13 36 12.84	2.0925	15 4 41.4	10.745	4	15 22 56.07	2.3585	22 4 20.0	6.282
5	13 38 18.54	2.0976	15 15 24.2	10.680	5	15 25 17.74	2.3640	22 10 33.2	6.159
6	13 40 24.55	2.1027	15 26 3.0	10.613	6	15 27 39.75	2.3695	22 16 39.1	6.036
7	13 42 30.86	2.1077	15 36 37.8	10.546	7	15 30 2.08	2.3749	22 22 37.5	5.911
8	13 44 37.48	2.1129	15 47 8.5	10.477	8	15 32 24.74	2.3803	22 28 28.4	5.786
9	13 46 44.41	2.1181	15 57 35.1	10.407	9	15 34 47.72	2.3857	22 34 11.8	5.660
10	13 48 51.65	2.1233	16 7 57.4	10.336	10	15 37 11.02	2.3910	22 39 47.6	5.532
11	13 50 59.21	2.1286	16 18 15.4	10.264	11	15 39 34.64	2.3962	22 45 15.7	5.403
12	13 53 7.08	2.1338	16 28 29.1	10.191	12	15 41 58.57	2.4015	22 50 36.0	5.273
13	13 55 15.27	2.1392	16 38 38.3	10.116	13	15 44 22.82	2.4067	22 55 48.5	5.142
14	13 57 23.78	2.1445	16 48 43.0	10.041	14	15 46 47.37	2.4117	23 0 53.0	5.009
15	13 59 32.61	2.1499	16 58 43.2	9.964	15	15 49 12.23	2.4169	23 5 49.6	4.877
16	14 1 41.77	2.1553	17 8 38.7	9.886	16	15 51 37.40	2.4220	23 10 38.2	4.743
17	14 3 51.25	2.1607	17 18 29.5	9.807	17	15 54 2.87	2.4270	23 15 18.7	4.607
18	14 6 1.05	2.1662	17 28 15.5	9.726	18	15 56 28.63	2.4318	23 19 51.0	4.470
19	14 8 11.19	2.1717	17 37 56.6	9.645	19	15 58 54.69	2.4367	23 24 15.1	4.333
20	14 10 21.66	2.1772	17 47 32.9	9.562	20	16 1 21.03	2.4414	23 28 31.0	4.195
21	14 12 32.46	2.1827	17 57 4.1	9.478	21	16 3 47.66	2.4462	23 32 38.5	4.055
22	14 14 43.59	2.1883	18 6 30.3	9.393	22	16 6 14.58	2.4509	23 36 37.6	3.915
23	14 16 55.06	2.1940	S. 18 15 51.3	9.307	23	16 8 41.77	2.4554	S. 23 40 28.3	3.773
THURSDAY 2.					SATURDAY 4.				
0	14 19 6.87	2.1996	S. 18 25 7.1	9.219	0	16 11 9.23	2.4600	S. 23 44 10.4	3.631
1	14 21 19.01	2.2052	18 34 17.6	9.131	1	16 13 36.97	2.4645	23 47 44.0	3.488
2	14 23 31.49	2.2108	18 43 22.8	9.042	2	16 16 4.97	2.4689	23 51 9.0	3.344
3	14 25 44.31	2.2165	18 52 22.6	8.950	3	16 18 33.24	2.4732	23 54 25.3	3.199
4	14 27 57.47	2.2222	19 1 16.8	8.857	4	16 21 1.76	2.4774	23 57 32.9	3.053
5	14 30 10.97	2.2278	19 10 5.5	8.764	5	16 23 30.53	2.4816	24 0 31.7	2.906
6	14 32 24.81	2.2336	19 18 48.5	8.669	6	16 25 59.55	2.4857	24 3 21.6	2.758
7	14 34 39.00	2.2393	19 27 25.8	8.573	7	16 28 28.82	2.4897	24 6 2.7	2.610
8	14 36 53.53	2.2450	19 35 57.3	8.477	8	16 30 58.32	2.4937	24 8 34.8	2.461
9	14 39 8.40	2.2507	19 44 23.0	8.379	9	16 33 28.06	2.4975	24 10 58.0	2.311
10	14 41 23.61	2.2564	19 52 42.8	8.279	10	16 35 58.02	2.5012	24 13 12.1	2.160
11	14 43 39.17	2.2622	20 0 56.5	8.178	11	16 38 28.20	2.5049	24 15 17.2	2.008
12	14 45 55.07	2.2679	20 9 4.1	8.076	12	16 40 58.61	2.5086	24 17 13.1	1.856
13	14 48 11.32	2.2737	20 17 5.6	7.973	13	16 43 29.23	2.5122	24 18 59.9	1.703
14	14 50 27.91	2.2794	20 25 0.8	7.868	14	16 46 0.05	2.5153	24 20 37.5	1.549
15	14 52 44.85	2.2852	20 32 49.7	7.762	15	16 48 31.07	2.5186	24 22 5.8	1.395
16	14 55 2.13	2.2908	20 40 32.3	7.656	16	16 51 2.28	2.5217	24 23 24.9	1.240
17	14 57 19.75	2.2966	20 48 8.4	7.547	17	16 53 33.68	2.5249	24 24 34.6	1.084
18	14 59 37.72	2.3023	20 55 38.0	7.438	18	16 56 5.27	2.5279	24 25 35.0	0.927
19	15 1 56.03	2.3080	21 3 1.0	7.328	19	16 58 37.03	2.5308	24 26 25.9	0.770
20	15 4 14.68	2.3137	21 10 17.4	7.217	20	17 1 8.97	2.5337	24 27 7.4	0.613
21	15 6 33.67	2.3193	21 17 27.0	7.103	21	17 3 41.07	2.5363	24 27 39.5	0.456
22	15 8 53.00	2.3250	21 24 29.8	6.990	22	17 6 13.33	2.5389	24 28 2.1	0.297
23	15 11 12.67	2.3307	21 31 25.8	6.875	23	17 8 45.74	2.5414	24 28 15.2	-0.137
24	15 13 32.68	2.3363	S. 21 38 14.8	6.758	24	17 11 18.30	2.5438	S. 24 28 18.6	+0.022

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 5.					TUESDAY 7.				
0	17 11 18.30	a.3438	S.24 28 18.6	+0.082	0	19 14 5.55	a.5326	S.21 21 29.5	7.667
1	17 13 51.00	a.3461	24 28 12.5	0.181	1	19 16 37.43	a.5301	21 13 45.0	7.816
2	17 16 23.83	a.3482	24 27 56.9	0.341	2	19 19 9.16	a.5274	21 5 51.6	7.962
3	17 18 56.79	a.3503	24 27 31.6	0.502	3	19 21 40.72	a.5247	20 57 49.5	8.107
4	17 21 29.87	a.3522	24 26 56.6	0.664	4	19 24 12.12	a.5220	20 49 38.7	8.252
5	17 24 3.06	a.3541	24 26 11.9	0.825	5	19 26 43.36	a.5192	20 41 19.2	8.396
6	17 26 36.36	a.3558	24 25 17.6	0.986	6	19 29 14.42	a.5168	20 32 51.2	8.537
7	17 29 9.76	a.3575	24 24 13.6	1.148	7	19 31 45.31	a.5133	20 24 14.7	8.679
8	17 31 43.26	a.3591	24 22 59.8	1.311	8	19 34 16.02	a.5103	20 15 29.7	8.820
9	17 34 16.85	a.3604	24 21 36.3	1.473	9	19 36 46.55	a.5072	20 6 36.3	8.959
10	17 36 50.51	a.3617	24 20 3.1	1.635	10	19 39 16.89	a.5042	19 57 34.6	9.097
11	17 39 24.25	a.3629	24 18 20.1	1.798	11	19 41 47.05	a.5010	19 48 24.6	9.235
12	17 41 58.06	a.3640	24 16 27.3	1.962	12	19 44 17.01	a.4977	19 39 6.4	9.370
13	17 44 31.93	a.3649	24 14 24.7	2.124	13	19 46 46.78	a.4945	19 29 40.2	9.504
14	17 47 5.85	a.3657	24 12 12.4	2.287	14	19 49 16.35	a.4912	19 20 5.9	9.638
15	17 49 39.82	a.3665	24 9 50.2	2.451	15	19 51 45.72	a.4878	19 10 23.6	9.770
16	17 52 13.83	a.3671	24 7 18.3	2.613	16	19 54 14.89	a.4845	19 0 33.5	9.900
17	17 54 47.87	a.3676	24 4 36.6	2.777	17	19 56 43.86	a.4811	18 50 35.6	10.030
18	17 57 21.94	a.3680	24 1 45.1	2.940	18	19 59 12.62	a.4775	18 40 29.9	10.158
19	17 59 56.03	a.3683	23 58 43.8	3.102	19	20 1 41.16	a.4740	18 30 16.6	10.285
20	18 2 30.14	a.3685	23 55 32.8	3.265	20	20 4 9.50	a.4706	18 19 55.7	10.411
21	18 5 4.25	a.3686	23 52 12.0	3.428	21	20 6 37.63	a.4670	18 9 27.3	10.535
22	18 7 38.37	a.3687	23 48 41.4	3.592	22	20 9 5.54	a.4633	17 58 51.5	10.658
23	18 10 12.49	a.3688	S.23 45 1.0	3.753	23	20 11 33.23	a.4597	S.17 48 8.3	10.779
MONDAY 6.					WEDNESDAY 8.				
0	18 12 46.59	a.3682	S.23 41 11.0	3.915	0	20 14 0.71	a.4562	S.17 37 18.0	10.898
1	18 15 20.67	a.3678	23 37 11.2	4.077	1	20 16 27.97	a.4525	17 26 20.5	11.017
2	18 17 54.73	a.3673	23 33 1.7	4.239	2	20 18 55.01	a.4487	17 15 15.9	11.135
3	18 20 28.75	a.3667	23 28 42.5	4.401	3	20 21 21.82	a.4450	17 4 4.3	11.251
4	18 23 2.74	a.3661	23 24 13.6	4.562	4	20 23 48.41	a.4413	16 52 45.8	11.365
5	18 25 36.68	a.3653	23 19 35.1	4.722	5	20 26 14.78	a.4376	16 41 20.5	11.477
6	18 28 10.57	a.3644	23 14 46.9	4.883	6	20 28 40.92	a.4338	16 29 48.5	11.589
7	18 30 44.41	a.3634	23 9 49.1	5.042	7	20 31 6.84	a.4301	16 18 9.8	11.699
8	18 33 18.18	a.3623	23 4 41.8	5.202	8	20 33 32.53	a.4263	16 6 24.6	11.807
9	18 35 51.89	a.3612	22 59 24.9	5.361	9	20 35 58.00	a.4226	15 54 33.0	11.913
10	18 38 25.52	a.3599	22 53 58.5	5.519	10	20 38 23.24	a.4187	15 42 35.0	12.019
11	18 40 59.08	a.3586	22 48 22.6	5.677	11	20 40 48.25	a.4149	15 30 30.7	12.123
12	18 43 32.55	a.3571	22 42 37.2	5.835	12	20 43 13.03	a.4112	15 18 20.2	12.225
13	18 46 5.93	a.3555	22 36 42.4	5.992	13	20 45 37.59	a.4074	15 6 3.7	12.324
14	18 48 39.21	a.3538	22 30 38.2	6.147	14	20 48 1.92	a.4036	14 53 41.3	12.422
15	18 51 12.39	a.3521	22 24 24.7	6.302	15	20 50 26.02	a.3998	14 41 13.0	12.520
16	18 53 45.46	a.3502	22 18 1.9	6.457	16	20 52 49.90	a.3961	14 28 38.9	12.616
17	18 56 18.42	a.3483	22 11 29.8	6.612	17	20 55 13.55	a.3923	14 15 59.1	12.710
18	18 58 51.26	a.3462	22 4 48.4	6.766	18	20 57 36.98	a.3887	14 3 13.7	12.802
19	19 1 23.97	a.3442	21 57 57.9	6.918	19	21 0 0.19	a.3849	13 50 22.9	12.893
20	19 3 56.56	a.3421	21 50 58.3	7.069	20	21 2 23.17	a.3811	13 37 26.6	12.982
21	19 6 29.02	a.3398	21 43 49.6	7.221	21	21 4 45.92	a.3774	13 24 25.1	13.068
22	19 9 1.34	a.3375	21 36 31.8	7.371	22	21 7 8.46	a.3737	13 11 18.4	13.154
23	19 11 33.52	a.3351	21 29 5.1	7.519	23	21 9 30.77	a.3700	12 58 6.6	13.237
24	19 14 5.55	a.3326	S.21 21 29.5	7.667	24	21 11 52.86	a.3663	S.12 44 49.9	13.319

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 9.					SATURDAY 11.				
0	21 11 52.86	2.3663	S. 12 44 49.9	13.319	0	23 1 53.36	2.2342	S. 1 4 7.5	15.200
1	21 14 14.73	2.3627	12 31 28.3	13.400	1	23 4 7.36	2.2326	0 48 55.6	15.196
2	21 16 36.39	2.3592	12 18 1.9	13.479	2	23 6 21.27	2.2311	0 33 44.0	15.190
3	21 18 57.83	2.3555	12 4 30.8	13.556	3	23 8 35.09	2.2297	0 18 32.8	15.183
4	21 21 19.05	2.3519	11 50 55.2	13.631	4	23 10 48.83	2.2282	S. 0 3 22.0	15.176
5	21 23 40.06	2.3484	11 37 15.1	13.705	5	23 13 2.48	2.2268	N. 0 11 48.3	15.165
6	21 26 0.86	2.3448	11 23 30.6	13.777	6	23 15 16.05	2.2256	0 26 57.8	15.152
7	21 28 21.44	2.3413	11 9 41.9	13.846	7	23 17 29.55	2.2243	0 42 6.6	15.139
8	21 30 41.82	2.3380	10 55 49.1	13.914	8	23 19 42.97	2.2231	0 57 14.5	15.124
9	21 33 2.00	2.3346	10 41 52.2	13.981	9	23 21 56.32	2.2219	1 12 21.5	15.107
10	21 35 21.97	2.3311	10 27 51.4	14.046	10	23 24 9.60	2.2208	1 27 27.4	15.089
11	21 37 41.73	2.3277	10 13 46.7	14.109	11	23 26 22.82	2.2198	1 42 32.2	15.068
12	21 40 1.30	2.3245	9 59 38.3	14.170	12	23 28 35.98	2.2188	1 57 35.6	15.046
13	21 42 20.67	2.3212	9 45 26.3	14.230	13	23 30 49.08	2.2179	2 12 37.7	15.023
14	21 44 39.84	2.3178	9 31 10.7	14.287	14	23 33 2.13	2.2170	2 27 38.4	14.998
15	21 46 58.81	2.3147	9 16 51.8	14.343	15	23 35 15.12	2.2162	2 42 37.5	14.972
16	21 49 17.60	2.3116	9 2 29.5	14.398	16	23 37 28.07	2.2154	2 57 35.0	14.944
17	21 51 36.20	2.3084	8 48 4.0	14.451	17	23 39 40.97	2.2147	3 12 30.8	14.914
18	21 53 54.61	2.3052	8 33 35.4	14.502	18	23 41 53.83	2.2140	3 27 24.7	14.882
19	21 56 12.83	2.3022	8 19 3.8	14.550	19	23 44 6.65	2.2134	3 42 16.7	14.850
20	21 58 30.87	2.2992	8 4 29.4	14.597	20	23 46 19.44	2.2128	3 57 6.7	14.815
21	22 0 48.73	2.2962	7 49 52.2	14.642	21	23 48 32.19	2.2122	4 11 54.5	14.779
22	22 3 6.42	2.2933	7 35 12.3	14.686	22	23 50 44.91	2.2118	4 26 40.2	14.742
23	22 5 23.93	2.2904	S. 7 20 29.9	14.727	23	23 52 57.61	2.2113	N. 4 41 23.6	14.704
FRIDAY 10.					SUNDAY 12.				
0	22 7 41.27	2.2876	S. 7 5 45.0	14.767	0	23 55 10.27	2.2109	N. 4 56 4.7	14.664
1	22 9 58.44	2.2847	6 50 57.8	14.806	1	23 57 22.92	2.2107	5 10 43.3	14.622
2	22 12 15.44	2.2820	6 36 8.3	14.843	2	23 59 35.55	2.2103	5 25 19.3	14.577
3	22 14 32.28	2.2793	6 21 16.7	14.877	3	0 1 48.16	2.2101	5 39 52.6	14.532
4	22 16 48.96	2.2767	6 6 23.1	14.910	4	0 4 0.76	2.2099	5 54 23.2	14.487
5	22 19 5.48	2.2740	5 51 27.5	14.941	5	0 6 13.35	2.2097	6 8 51.1	14.440
6	22 21 21.84	2.2714	5 36 30.2	14.970	6	0 8 25.93	2.2097	6 23 16.0	14.390
7	22 23 38.05	2.2690	5 21 31.1	14.998	7	0 10 38.51	2.2096	6 37 37.9	14.339
8	22 25 54.12	2.2666	5 6 30.4	15.024	8	0 12 51.08	2.2096	6 51 56.7	14.287
9	22 28 10.04	2.2641	4 51 28.2	15.048	9	0 15 3.66	2.2097	7 6 12.4	14.234
10	22 30 25.81	2.2617	4 36 24.6	15.070	10	0 17 16.24	2.2097	7 20 24.8	14.179
11	22 32 41.44	2.2594	4 21 19.8	15.091	11	0 19 28.82	2.2097	7 34 33.9	14.123
12	22 34 56.94	2.2572	4 6 13.7	15.110	12	0 21 41.41	2.2099	7 48 39.6	14.066
13	22 37 12.30	2.2549	3 51 6.6	15.126	13	0 23 54.01	2.2108	8 2 41.8	14.007
14	22 39 27.53	2.2528	3 35 58.6	15.141	14	0 26 6.63	2.2104	8 16 40.5	13.947
15	22 41 42.64	2.2507	3 20 49.7	15.155	15	0 28 19.26	2.2106	8 30 35.5	13.885
16	22 43 57.62	2.2487	3 5 40.0	15.167	16	0 30 31.90	2.2109	8 44 26.7	13.822
17	22 46 12.48	2.2467	2 50 29.7	15.177	17	0 32 44.57	2.2113	8 58 14.1	13.758
18	22 48 27.22	2.2447	2 35 18.8	15.186	18	0 34 57.26	2.2117	9 11 57.7	13.693
19	22 50 41.84	2.2428	2 20 7.4	15.192	19	0 37 9.97	2.2121	9 25 37.3	13.626
20	22 52 56.36	2.2410	2 4 55.7	15.197	20	0 39 22.71	2.2126	9 39 12.8	13.557
21	22 55 10.76	2.2392	1 49 43.8	15.200	21	0 41 35.48	2.2131	9 52 44.2	13.488
22	22 57 25.06	2.2375	1 34 31.7	15.202	22	0 43 48.28	2.2136	10 6 11.4	13.417
23	22 59 39.26	2.2358	1 19 19.6	15.202	23	0 46 1.11	2.2141	10 19 34.3	13.346
24	23 1 53.36	2.2342	S. 1 4 7.5	15.200	24	0 48 13.97	2.2147	N. 10 32 52.9	13.273

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 13.					WEDNESDAY 15.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	48 13.97	2.2147	N.10 32 52.9	13.273	0	2 35 35.80	2.2613	N.19 25 30.8	8.573
1	0 50 26.87	2.2153	10 46 7.1	13.198	1	2 37 51.51	2.2623	19 34 1.7	8.457
2	0 52 39.81	2.2160	10 59 16.7	13.123	2	2 40 7.28	2.2632	19 42 25.6	8.339
3	0 54 52.79	2.2167	11 12 21.8	13.047	3	2 42 23.10	2.2642	19 50 42.4	8.221
4	0 57 5.81	2.2173	11 25 22.3	12.958	4	2 44 38.98	2.2650	19 58 52.1	8.102
5	0 59 18.87	2.2181	11 38 18.0	12.889	5	2 46 54.90	2.2657	20 6 54.6	7.982
6	1 1 31.98	2.2188	11 51 9.0	12.809	6	2 49 10.87	2.2666	20 14 50.0	7.863
7	1 3 45.13	2.2197	12 3 55.1	12.727	7	2 51 26.89	2.2674	20 22 38.2	7.742
8	1 5 58.34	2.2205	12 16 36.3	12.645	8	2 53 42.96	2.2682	20 30 19.1	7.622
9	1 8 11.59	2.2213	12 29 12.5	12.562	9	2 55 59.07	2.2688	20 37 52.8	7.501
10	1 10 24.89	2.2222	12 41 43.7	12.477	10	2 58 15.22	2.2695	20 45 19.2	7.379
11	1 12 38.25	2.2232	12 54 9.8	12.392	11	3 0 31.41	2.2702	20 52 38.3	7.257
12	1 14 51.67	2.2241	13 6 30.7	12.305	12	3 2 47.64	2.2708	20 59 50.1	7.135
13	1 17 5.14	2.2249	13 18 46.4	12.217	13	3 5 3.91	2.2714	21 6 54.5	7.012
14	1 19 18.66	2.2258	13 30 56.7	12.127	14	3 7 20.21	2.2720	21 13 51.6	6.889
15	1 21 32.24	2.2268	13 43 1.7	12.037	15	3 9 36.55	2.2726	21 20 41.2	6.765
16	1 23 45.88	2.2277	13 55 1.2	11.947	16	3 11 52.92	2.2731	21 27 23.4	6.642
17	1 25 59.57	2.2287	14 6 55.3	11.855	17	3 14 9.32	2.2736	21 33 58.2	6.517
18	1 28 13.33	2.2298	14 18 43.8	11.762	18	3 16 25.75	2.2740	21 40 25.5	6.392
19	1 30 27.15	2.2308	14 30 26.7	11.667	19	3 18 42.20	2.2743	21 46 45.3	6.267
20	1 32 41.03	2.2318	14 42 3.9	11.572	20	3 20 58.67	2.2747	21 52 57.6	6.142
21	1 34 54.97	2.2329	14 53 35.4	11.477	21	3 23 15.16	2.2750	21 59 2.4	6.017
22	1 37 8.98	2.2339	15 5 1.1	11.379	22	3 25 31.67	2.2753	22 4 59.7	5.892
23	1 39 23.04	2.2349	N.15 16 20.9	11.282	23	3 27 48.20	2.2755	N.22 10 49.4	5.766
TUESDAY 14.					THURSDAY 16.				
0	1 41 37.17	2.2361	N.15 27 34.9	11.183	0	3 30 4.73	2.2757	N.22 16 31.6	5.640
1	1 43 51.37	2.2372	15 38 42.9	11.083	1	3 32 21.28	2.2759	22 22 6.2	5.513
2	1 46 5.63	2.2382	15 49 44.9	10.982	2	3 34 37.84	2.2760	22 27 33.2	5.386
3	1 48 19.95	2.2392	16 0 40.8	10.881	3	3 36 54.40	2.2761	22 32 52.5	5.259
4	1 50 34.34	2.2404	16 11 30.6	10.779	4	3 39 10.97	2.2761	22 38 4.3	5.132
5	1 52 48.80	2.2415	16 22 14.3	10.676	5	3 41 27.53	2.2761	22 43 8.4	5.005
6	1 55 3.32	2.2426	16 32 51.7	10.572	6	3 43 44.10	2.2761	22 48 4.9	4.878
7	1 57 17.91	2.2437	16 43 22.9	10.467	7	3 46 0.66	2.2759	22 52 53.8	4.751
8	1 59 32.57	2.2448	16 53 47.8	10.362	8	3 48 17.21	2.2757	22 57 35.0	4.623
9	2 1 47.29	2.2459	17 4 6.3	10.255	9	3 50 33.75	2.2755	23 2 8.6	4.496
10	2 4 2.08	2.2471	17 14 18.4	10.148	10	3 52 50.27	2.2752	23 6 34.5	4.367
11	2 6 16.94	2.2482	17 24 24.1	10.040	11	3 55 6.78	2.2750	23 10 52.7	4.240
12	2 8 31.86	2.2492	17 34 23.2	9.931	12	3 57 23.27	2.2747	23 15 3.3	4.112
13	2 10 46.85	2.2503	17 44 15.8	9.822	13	3 59 39.74	2.2742	23 19 6.2	3.984
14	2 13 1.90	2.2513	17 54 1.9	9.712	14	4 1 56.18	2.2738	23 23 1.4	3.857
15	2 15 17.01	2.2524	18 3 41.3	9.601	15	4 4 12.60	2.2734	23 26 49.0	3.729
16	2 17 32.19	2.2535	18 13 14.0	9.489	16	4 6 28.99	2.2728	23 30 28.9	3.601
17	2 19 47.43	2.2545	18 22 40.0	9.377	17	4 8 45.34	2.2722	23 34 1.1	3.472
18	2 22 2.73	2.2555	18 31 59.3	9.265	18	4 11 1.66	2.2717	23 37 25.6	3.344
19	2 24 18.09	2.2566	18 41 11.8	9.151	19	4 13 17.94	2.2709	23 40 42.4	3.217
20	2 26 33.52	2.2576	18 50 17.4	9.037	20	4 15 34.17	2.2701	23 43 51.6	3.089
21	2 28 49.00	2.2586	18 59 16.2	8.922	21	4 17 50.35	2.2693	23 46 53.1	2.961
22	2 31 4.55	2.2596	19 8 8.0	8.806	22	4 20 6.49	2.2686	23 49 46.9	2.832
23	2 33 20.15	2.2604	19 16 52.9	8.690	23	4 22 22.58	2.2677	23 52 33.0	2.705
24	2 35 35.80	2.2613	N.19 25 30.8	8.573	24	4 24 38.61	2.2667	N.23 55 11.5	2.577



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 17.					SUNDAY 19.				
0	h m s		N. ° ' "	"	0	h m s		N. ° ' "	"
1	4 24 38.61	2.2667	23 55 11.5	2.577	1	6 11 26.16	2.1663	23 36 17.3	3.228
2	4 26 54.59	2.2637	23 57 42.3	2.450	2	6 13 36.05	2.1633	23 33 0.3	3.339
3	4 29 10.50	2.2647	24 0 5.5	2.322	3	6 15 45.76	2.1602	23 29 36.6	3.450
4	4 31 26.35	2.2636	24 2 21.0	2.195	4	6 17 55.28	2.1572	23 26 6.3	3.559
5	4 33 42.13	2.2624	24 4 28.9	2.068	5	6 20 4.62	2.1541	23 22 29.5	3.667
6	4 35 57.84	2.2612	24 6 29.2	1.941	6	6 22 13.77	2.1509	23 18 46.2	3.776
7	4 38 13.47	2.2599	24 8 21.8	1.814	7	6 24 22.73	2.1477	23 14 56.4	3.883
8	4 40 29.03	2.2587	24 10 6.9	1.687	8	6 26 31.50	2.1446	23 11 0.2	3.991
9	4 42 44.51	2.2573	24 11 44.3	1.561	9	6 28 40.08	2.1415	23 6 57.5	4.097
10	4 44 59.91	2.2559	24 13 14.2	1.435	10	6 30 48.48	2.1383	23 2 48.5	4.203
11	4 47 15.22	2.2545	24 14 36.5	1.308	11	6 32 56.68	2.1350	22 58 33.1	4.310
12	4 49 30.45	2.2531	24 15 51.2	1.182	12	6 35 4.68	2.1317	22 54 11.3	4.414
13	4 51 45.59	2.2515	24 16 58.4	1.057	13	6 37 12.49	2.1286	22 49 43.4	4.517
14	4 54 0.63	2.2498	24 17 58.1	0.932	14	6 39 20.11	2.1253	22 45 9.2	4.622
15	4 56 15.57	2.2482	24 18 50.2	0.807	15	6 41 27.53	2.1220	22 40 28.7	4.726
16	4 58 30.41	2.2465	24 19 34.9	0.682	16	6 43 34.75	2.1187	22 35 42.1	4.828
17	5 0 45.15	2.2447	24 20 12.0	0.557	17	6 45 41.78	2.1155	22 30 49.3	4.930
18	5 2 59.78	2.2429	24 20 41.7	0.433	18	6 47 48.61	2.1121	22 25 50.5	5.031
19	5 5 14.30	2.2411	24 21 4.0	0.309	19	6 49 55.23	2.1087	22 20 45.6	5.132
20	5 7 28.71	2.2392	24 21 18.8	0.185	20	6 52 1.66	2.1055	22 15 34.6	5.232
21	5 9 43.01	2.2373	24 21 26.2	+0.062	21	6 54 7.89	2.1022	22 10 17.7	5.332
22	5 11 57.19	2.2352	24 21 26.2	-0.061	22	6 56 13.92	2.0988	22 4 54.8	5.431
23	5 14 11.24	2.2332	24 21 18.9	0.183	23	6 58 19.75	2.0955	21 59 26.0	5.529
	5 16 25.17	2.2312	N. 24 21 4.2	0.307		7 0 25.38	2.0921	N. 21 53 51.3	5.627
SATURDAY 18.					MONDAY 20.				
0	5 18 38.98	2.2291	N. 24 20 42.1	0.429	0	7 2 30.80	2.0887	N. 21 48 10.8	5.723
1	5 20 52.66	2.2269	24 20 12.7	0.550	1	7 4 36.02	2.0854	21 42 24.5	5.820
2	5 23 6.21	2.2247	24 19 36.1	0.671	2	7 6 41.05	2.0821	21 36 32.4	5.917
3	5 25 19.62	2.2224	24 18 52.2	0.792	3	7 8 45.87	2.0786	21 30 34.5	6.012
4	5 27 32.90	2.2201	24 18 1.0	0.912	4	7 10 50.48	2.0753	21 24 31.0	6.106
5	5 29 46.03	2.2177	24 17 2.7	1.032	5	7 12 54.90	2.0720	21 18 21.8	6.200
6	5 31 59.03	2.2154	24 15 57.1	1.152	6	7 14 59.12	2.0686	21 12 7.0	6.293
7	5 34 11.88	2.2130	24 14 44.4	1.272	7	7 17 3.13	2.0652	21 5 46.6	6.386
8	5 36 24.59	2.2105	24 13 24.5	1.390	8	7 19 6.95	2.0619	20 59 20.7	6.477
9	5 38 37.14	2.2080	24 11 57.6	1.508	9	7 21 10.56	2.0585	20 52 49.3	6.569
10	5 40 49.55	2.2055	24 10 23.5	1.627	10	7 23 13.97	2.0552	20 46 12.4	6.660
11	5 43 1.80	2.2029	24 8 42.4	1.744	11	7 25 17.18	2.0518	20 39 30.1	6.750
12	5 45 13.90	2.2003	24 6 54.2	1.862	12	7 27 20.19	2.0485	20 32 42.4	6.839
13	5 47 25.84	2.1977	24 4 59.0	1.978	13	7 29 23.00	2.0452	20 25 49.4	6.928
14	5 49 37.62	2.1950	24 2 56.8	2.094	14	7 31 25.61	2.0419	20 18 51.0	7.017
15	5 51 49.24	2.1922	24 0 47.7	2.210	15	7 33 28.03	2.0386	20 11 47.4	7.104
16	5 54 0.69	2.1894	23 58 31.6	2.326	16	7 35 30.24	2.0352	20 4 38.5	7.192
17	5 56 11.97	2.1867	23 56 8.6	2.440	17	7 37 32.26	2.0320	19 57 24.4	7.277
18	5 58 23.09	2.1839	23 53 38.8	2.553	18	7 39 34.08	2.0287	19 50 5.2	7.363
19	6 0 34.04	2.1811	23 51 2.2	2.667	19	7 41 35.71	2.0255	19 42 40.8	7.448
20	6 2 44.82	2.1782	23 48 18.7	2.782	20	7 43 37.14	2.0222	19 35 11.4	7.532
21	6 4 55.42	2.1752	23 45 28.4	2.894	21	7 45 38.38	2.0190	19 27 36.9	7.617
22	6 7 5.84	2.1722	23 42 31.4	3.006	22	7 47 39.42	2.0157	19 19 57.4	7.700
23	6 9 16.09	2.1693	23 39 27.7	3.117	23	7 49 40.27	2.0126	19 12 12.9	7.782
24	6 11 26.16	2.1663	N. 23 36 17.3	3.228	24	7 51 40.93	2.0091	N. 19 4 23.6	7.863

GREENWICH MEAN TIME.															
THE MOON'S RIGHT ASCENSION AND DECLINATION.															
Hour.	Right Ascension.			Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.			Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.		
TUESDAY 21.							THURSDAY 23.								
0	h	m	s	"	N. 19	4 23.6	7.863	0	h	m	s	"	N. 11	25 5.5	11.023
1	7 51	40.93	2.0094	18 56	29.3	7.945	1	9 26	51.54	1.8888	11 14	2.6	11.072		
2	7 53	41.40	2.0062	18 48	30.2	8.025	2	9 28	44.82	1.8873	11 2	56.8	11.122		
3	7 55	41.68	2.0031	18 40	26.3	8.105	3	9 30	38.02	1.8859	10 51	48.0	11.171		
4	7 57	41.77	2.0000	18 32	17.6	8.185	4	9 32	31.13	1.8845	10 40	36.3	11.218		
5	7 59	41.68	1.9969	18 24	4.1	8.265	5	9 34	24.16	1.8832	10 29	21.8	11.266		
6	8 1	41.40	1.9938	18 15	46.0	8.341	6	9 36	17.11	1.8818	10 18	4.4	11.312		
7	8 3	40.94	1.9907	18 7	23.2	8.417	7	9 38	9.97	1.8805	10 6	44.3	11.357		
8	8 5	40.29	1.9877	17 58	55.9	8.494	8	9 40	2.77	1.8793	9 55	21.5	11.402		
9	8 7	39.46	1.9847	17 50	23.9	8.571	9	9 41	55.49	1.8781	9 43	56.0	11.447		
10	8 9	38.46	1.9817	17 41	47.4	8.646	10	9 43	48.14	1.8769	9 32	27.8	11.491		
11	8 11	37.27	1.9787	17 33	6.4	8.720	11	9 45	40.72	1.8758	9 20	57.1	11.533		
12	8 13	35.91	1.9757	17 24	21.0	8.794	12	9 47	33.24	1.8748	9 9	23.8	11.576		
13	8 15	34.37	1.9729	17 15	31.1	8.867	13	9 49	25.70	1.8738	8 57	48.0	11.617		
14	8 17	32.66	1.9701	17 6	36.9	8.940	14	9 51	18.10	1.8728	8 46	9.7	11.659		
15	8 19	30.78	1.9672	16 57	38.3	9.012	15	9 53	10.44	1.8719	8 34	28.9	11.700		
16	8 21	28.72	1.9643	16 48	35.4	9.084	16	9 55	2.73	1.8711	8 22	45.7	11.739		
17	8 23	26.50	1.9616	16 39	28.2	9.155	17	9 56	54.97	1.8703	8 11	0.2	11.777		
18	8 25	24.11	1.9587	16 30	16.8	9.224	18	9 58	47.17	1.8696	7 59	12.4	11.816		
19	8 27	21.55	1.9560	16 21	1.3	9.293	19	10 0	39.32	1.8688	7 47	22.3	11.853		
20	8 29	18.83	1.9533	16 11	41.6	9.362	20	10 2	31.43	1.8682	7 35	30.0	11.890		
21	8 31	15.95	1.9507	16 2	17.8	9.431	21	10 4	23.51	1.8677	7 23	35.5	11.927		
22	8 33	12.91	1.9480	15 52	49.9	9.498	22	10 6	15.56	1.8672	7 11	38.8	11.962		
23	8 35	9.71	1.9454	N. 15	43 18.0	9.565	23	10 8	7.57	1.8666	N. 6	59 40.0	11.996		
24	8 37	6.36	1.9428												
WEDNESDAY 22.							FRIDAY 24.								
0	h	m	s	"	N. 15	33 42.1	9.631	0	h	m	s	"	N. 6	47 39.3	12.029
1	8 39	2.85	1.9404	15 24	2.3	9.697	1	10 9	59.55	1.8662	6 35	36.5	12.064		
2	8 40	59.19	1.9377	15 14	18.5	9.762	2	10 11	51.51	1.8657	6 23	31.6	12.097		
3	8 42	55.38	1.9352	15 4	30.9	9.826	3	10 13	43.44	1.8654	6 11	24.9	12.128		
4	8 54	51.42	1.9328	14 54	39.4	9.889	4	10 15	35.36	1.8652	5 59	16.2	12.160		
5	8 46	47.32	1.9304	14 44	44.2	9.952	5	10 17	27.26	1.8649	5 47	5.7	12.190		
6	8 48	43.07	1.9280	14 34	45.2	10.015	6	10 19	19.15	1.8647	5 34	53.4	12.220		
7	8 50	38.68	1.9257	14 24	42.4	10.077	7	10 21	11.03	1.8646	5 22	39.3	12.249		
8	8 52	34.15	1.9233	14 14	36.0	10.137	8	10 23	2.90	1.8645	5 10	23.5	12.277		
9	8 54	29.48	1.9211	14 4	26.0	10.197	9	10 24	54.77	1.8645	4 58	6.0	12.305		
10	8 56	24.68	1.9189	13 54	12.3	10.257	10	10 26	46.64	1.8646	4 45	46.9	12.332		
11	8 58	19.75	1.9167	13 43	55.1	10.316	11	10 28	38.52	1.8646	4 33	26.2	12.358		
12	9 0	14.69	1.9146	13 33	34.4	10.374	12	10 30	30.40	1.8647	4 21	3.9	12.384		
13	9 2	9.50	1.9125	13 23	10.2	10.432	13	10 32	22.29	1.8649	4 8	40.1	12.408		
14	9 4	4.19	1.9104	13 12	42.6	10.488	14	10 34	14.19	1.8652	3 56	14.9	12.432		
15	9 5	58.75	1.9083	13 2	11.6	10.545	15	10 36	6.11	1.8653	3 43	48.3	12.455		
16	9 7	53.19	1.9063	12 51	37.2	10.602	16	10 37	58.05	1.8658	3 31	20.3	12.477		
17	9 9	47.51	1.9044	12 40	59.4	10.657	17	10 39	50.01	1.8662	3 18	51.0	12.499		
18	9 11	41.72	1.9025	12 30	18.4	10.710	18	10 41	42.00	1.8667	3 6	20.4	12.520		
19	9 13	35.81	1.9007	12 19	34.2	10.764	19	10 43	34.02	1.8672	2 53	48.6	12.540		
20	9 15	29.80	1.8989	12 8	46.7	10.817	20	10 45	26.07	1.8678	2 41	15.6	12.559		
21	9 17	23.68	1.8971	11 57	56.1	10.870	21	10 47	18.16	1.8684	2 28	41.5	12.577		
22	9 19	17.45	1.8953	11 47	2.3	10.922	22	10 49	10.28	1.8691	2 16	6.3	12.596		
23	9 21	11.12	1.8937	11 36	5.4	10.973	23	10 51	2.45	1.8699	2 3	30.0	12.612		
24	9 23	4.69	1.8920	N. 11	25 5.5	11.023	24	10 52	54.67	1.8707	N. 1	50 52.8	12.628		
	9 24	58.16	1.8904					10 54	46.93	1.8715					

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 25.					MONDAY 27.				
0	10 54 46.93	1.8715	N. 1 50 52.8	12.628	0	12 26 39.53	1.9782	S. 8 17 56.6	12.389
1	10 56 39.25	1.8724	1 38 14.6	12.644	1	12 28 38.33	1.9818	8 30 19.1	12.361
2	10 58 31.62	1.8733	1 25 35.5	12.659	2	12 30 37.35	1.9854	8 42 39.9	12.332
3	11 0 24.05	1.8743	1 12 55.5	12.673	3	12 32 36.58	1.9891	8 54 58.9	12.302
4	11 2 16.54	1.8754	1 0 14.7	12.686	4	12 34 36.04	1.9928	9 7 16.1	12.270
5	11 4 9.10	1.8766	0 47 33.2	12.697	5	12 36 35.72	1.9966	9 19 31.3	12.237
6	11 6 1.73	1.8777	0 34 51.0	12.709	6	12 38 35.63	2.0005	9 31 44.5	12.203
7	11 7 54.43	1.8790	0 22 8.1	12.720	7	12 40 35.78	2.0044	9 43 55.7	12.168
8	11 9 47.21	1.8803	N. 0 9 24.6	12.730	8	12 42 36.16	2.0082	9 56 4.7	12.132
9	11 11 40.07	1.8817	S. 0 3 19.5	12.739	9	12 44 36.77	2.0122	10 8 11.6	12.096
10	11 13 33.01	1.8830	0 16 4.1	12.747	10	12 46 37.62	2.0162	10 20 16.2	12.058
11	11 15 26.03	1.8845	0 28 49.1	12.753	11	12 48 38.72	2.0203	10 32 18.5	12.018
12	11 17 19.15	1.8861	0 41 34.5	12.760	12	12 50 40.06	2.0244	10 44 18.4	11.978
13	11 19 12.36	1.8874	0 54 20.3	12.766	13	12 52 41.65	2.0287	10 56 15.9	11.937
14	11 21 5.67	1.8892	1 7 6.4	12.771	14	12 54 43.50	2.0329	11 8 10.8	11.893
15	11 22 59.07	1.8909	1 19 52.8	12.775	15	12 56 45.60	2.0371	11 20 3.1	11.850
16	11 24 52.58	1.8927	1 32 39.4	12.778	16	12 58 47.95	2.0414	11 31 52.8	11.806
17	11 26 46.19	1.8944	1 45 26.2	12.781	17	13 0 50.57	2.0458	11 43 39.8	11.759
18	11 28 39.91	1.8963	1 58 13.1	12.782	18	13 2 53.45	2.0502	11 55 23.9	11.712
19	11 30 33.75	1.8983	2 11 0.0	12.782	19	13 4 56.60	2.0547	12 7 5.2	11.664
20	11 32 27.71	1.9002	2 23 46.9	12.782	20	13 7 0.01	2.0592	12 18 43.6	11.615
21	11 34 21.78	1.9022	2 36 33.8	12.780	21	13 9 3.70	2.0637	12 30 19.0	11.564
22	11 36 15.98	1.9043	2 49 20.5	12.777	22	13 11 7.66	2.0682	12 41 51.3	11.512
23	11 38 10.30	1.9065	S. 3 2 7.1	12.774	23	13 13 11.89	2.0728	S. 12 53 20.5	11.459
SUNDAY 26.					TUESDAY 28.				
0	11 40 4.76	1.9087	S. 3 14 53.4	12.770	0	13 15 16.40	2.0775	S. 13 4 46.4	11.405
1	11 41 59.35	1.9110	3 27 39.5	12.766	1	13 17 21.19	2.0822	13 16 9.1	11.350
2	11 43 54.08	1.9132	3 40 25.3	12.761	2	13 19 26.27	2.0870	13 27 28.4	11.293
3	11 45 48.94	1.9156	3 53 10.8	12.754	3	13 21 31.63	2.0917	13 38 44.3	11.236
4	11 47 43.95	1.9181	4 5 55.8	12.746	4	13 23 37.27	2.0965	13 49 56.7	11.177
5	11 49 39.11	1.9206	4 18 40.3	12.737	5	13 25 43.21	2.1014	14 1 5.6	11.117
6	11 51 34.42	1.9231	4 31 24.3	12.727	6	13 27 49.44	2.1062	14 12 10.8	11.056
7	11 53 29.88	1.9257	4 44 7.6	12.717	7	13 29 55.96	2.1112	14 23 12.3	10.994
8	11 55 25.50	1.9283	4 56 50.3	12.706	8	13 32 2.78	2.1162	14 34 10.1	10.931
9	11 57 21.28	1.9311	5 9 32.3	12.693	9	13 34 9.90	2.1212	14 45 4.0	10.865
10	11 59 17.23	1.9338	5 22 13.5	12.680	10	13 36 17.32	2.1261	14 55 53.9	10.799
11	12 1 13.34	1.9366	5 34 53.9	12.666	11	13 38 25.03	2.1312	15 6 39.9	10.732
12	12 3 9.62	1.9395	5 47 33.4	12.650	12	13 40 33.06	2.1363	15 17 21.8	10.663
13	12 5 6.08	1.9424	6 0 11.9	12.633	13	13 42 41.39	2.1413	15 27 59.5	10.593
14	12 7 2.71	1.9454	6 12 49.4	12.617	14	13 44 50.02	2.1464	15 38 33.0	10.522
15	12 8 59.53	1.9485	6 25 25.9	12.599	15	13 46 58.96	2.1516	15 49 2.2	10.450
16	12 10 56.53	1.9515	6 38 1.3	12.580	16	13 49 8.21	2.1567	15 59 27.0	10.377
17	12 12 53.71	1.9547	6 50 35.5	12.560	17	13 51 17.77	2.1620	16 9 47.4	10.302
18	12 14 51.09	1.9579	7 3 8.5	12.538	18	13 53 27.65	2.1672	16 20 3.3	10.227
19	12 16 48.66	1.9612	7 15 40.1	12.516	19	13 55 37.84	2.1724	16 30 14.6	10.149
20	12 18 46.43	1.9644	7 28 10.4	12.492	20	13 57 48.34	2.1777	16 40 21.2	10.071
21	12 20 44.39	1.9677	7 40 39.2	12.468	21	13 59 59.16	2.1830	16 50 23.1	9.991
22	12 22 42.56	1.9712	7 53 6.6	12.443	22	14 2 10.30	2.1883	17 0 20.1	9.910
23	12 24 40.94	1.9747	8 5 32.4	12.417	23	14 4 21.76	2.1937	17 10 12.3	9.828
24	12 26 39.53	1.9782	S. 8 17 56.6	12.389	24	14 6 33.54	2.1990	S. 17 19 59.5	9.742

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 29.					FRIDAY 31.				
0	14 6 33.54	2.1990	S. 17 19 59.5	9.745	0	15 58 9.09	2.4402	S. 23 8 28.0	4.332
1	14 8 45.64	2.2043	17 29 41.7	9.660	1	16 0 35.62	2.4442	23 12 43.7	4.192
2	14 10 58.06	2.2097	17 39 18.7	9.574	2	16 3 2.39	2.4481	23 16 51.1	4.052
3	14 13 10.80	2.2150	17 48 50.6	9.487	3	16 5 29.39	2.4519	23 20 50.0	3.911
4	14 15 23.86	2.2204	17 58 17.2	9.398	4	16 7 56.62	2.4557	23 24 40.4	3.769
5	14 17 37.25	2.2258	18 7 38.4	9.309	5	16 10 24.07	2.4593	23 28 22.3	3.627
6	14 19 50.96	2.2312	18 16 54.3	9.218	6	16 12 51.74	2.4629	23 31 55.7	3.485
7	14 22 4.99	2.2366	18 26 4.6	9.126	7	16 15 19.62	2.4664	23 35 20.5	3.341
8	14 24 19.35	2.2420	18 35 9.4	9.032	8	16 17 47.71	2.4698	23 38 36.6	3.195
9	14 26 34.03	2.2474	18 44 8.5	8.938	9	16 20 16.00	2.4731	23 41 43.9	3.050
10	14 28 49.04	2.2528	18 53 2.0	8.842	10	16 22 44.48	2.4763	23 44 42.6	2.904
11	14 31 4.37	2.2582	19 1 49.6	8.745	11	16 25 13.16	2.4795	23 47 32.4	2.757
12	14 33 20.02	2.2636	19 10 31.4	8.647	12	16 27 42.02	2.4826	23 50 13.4	2.609
13	14 35 36.00	2.2690	19 19 7.3	8.547	13	16 30 11.07	2.4856	23 52 45.5	2.461
14	14 37 52.30	2.2744	19 27 37.1	8.446	14	16 32 40.29	2.4884	23 55 8.7	2.312
15	14 40 8.93	2.2797	19 36 0.8	8.344	15	16 35 9.68	2.4912	23 57 23.0	2.163
16	14 42 25.87	2.2851	19 44 18.4	8.242	16	16 37 39.24	2.4940	23 59 28.3	2.012
17	14 44 43.14	2.2905	19 52 29.8	8.137	17	16 40 8.96	2.4966	24 1 24.5	1.862
18	14 47 0.73	2.2958	20 0 34.8	8.031	18	16 42 38.83	2.4991	24 3 11.7	1.711
19	14 49 18.64	2.3012	20 8 33.5	7.924	19	16 45 8.85	2.5015	24 4 49.8	1.559
20	14 51 36.87	2.3066	20 16 25.7	7.816	20	16 47 39.01	2.5037	24 6 18.8	1.407
21	14 53 55.41	2.3117	20 24 11.4	7.707	21	16 50 9.30	2.5060	24 7 38.6	1.254
22	14 56 14.27	2.3170	20 31 50.5	7.597	22	16 52 39.73	2.5082	24 8 49.3	1.102
23	14 58 33.45	2.3222	S. 20 39 23.0	7.485	23	16 55 10.28	2.5102	S. 24 9 50.8	0.948
THURSDAY 30.					SATURDAY, APRIL 1.				
0	15 0 52.94	2.3275	S. 20 46 48.7	7.372	0	16 57 40.95	2.5121	S. 24 10 43.1	0.794
1	15 3 12.75	2.3327	20 54 7.6	7.257	PHASES OF THE MOON.  ☾ Last Quarter . . . Mar. 4 16 6.6 ● New Moon . . . . . 11 7 52.8 ☾ First Quarter . . . . . 18 15 23.8 ○ Full Moon . . . . . 26 18 18.5				
2	15 5 32.86	2.3377	21 1 19.6	7.142					
3	15 7 53.28	2.3429	21 8 24.7	7.026					
4	15 10 14.01	2.3481	21 15 22.7	6.908					
5	15 12 35.05	2.3531	21 22 13.6	6.789	☾ Perigee . . . . . Mar. 9 9.9 ☾ Apogee . . . . . 21 6.6				
6	15 14 56.38	2.3581	21 28 57.4	6.670					
7	15 17 18.02	2.3631	21 35 34.0	6.548					
8	15 19 39.95	2.3680	21 42 3.2	6.426					
9	15 22 2.18	2.3729	21 48 25.1	6.303					
10	15 24 24.70	2.3778	21 54 39.6	6.179					
11	15 26 47.52	2.3827	22 0 46.6	6.054					
12	15 29 10.62	2.3874	22 6 46.1	5.927					
13	15 31 34.01	2.3921	22 12 37.9	5.800					
14	15 33 57.67	2.3967	22 18 22.1	5.672					
15	15 36 21.62	2.4014	22 23 58.5	5.542					
16	15 38 45.84	2.4059	22 29 27.1	5.412					
17	15 41 10.33	2.4104	22 34 47.9	5.280					
18	15 43 35.09	2.4149	22 40 0.7	5.147					
19	15 46 0.12	2.4193	22 45 5.5	5.013					
20	15 48 25.41	2.4236	22 50 2.3	4.879					
21	15 50 50.95	2.4278	22 54 51.0	4.744					
22	15 53 16.75	2.4321	22 59 31.6	4.607					
23	15 55 42.80	2.4362	23 4 3.9	4.470					
24	15 58 9.09	2.4402	S. 23 8 28.0	4.332					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	Pollux W.	94 19 16	2760	95 54 37	2750	97 30 10	2741	99 5 55	2733
	Regulus W.	57 22 26	2735	58 58 20	2725	60 34 27	2716	62 10 46	2705
	Antares E.	42 34 28	2724	40 58 20	2715	39 22 0	2706	37 45 28	2698
	SATURN E.	57 29 18	2741	55 53 32	2731	54 17 33	2722	52 41 22	2713
	VENUS E.	89 23 58	3101	87 55 49	3090	86 27 27	3081	84 58 54	3070
	α Aquilæ E.	96 26 21	3228	95 0 45	3217	93 34 56	3206	92 8 54	3195
2	Regulus W.	70 15 44	2655	71 53 25	2645	73 31 19	2634	75 9 28	2624
	SATURN E.	44 37 23	2666	42 59 57	2656	41 22 18	2646	39 44 26	2637
	VENUS E.	77 32 56	3018	76 3 5	3007	74 33 1	2996	73 2 43	2985
	α Aquilæ E.	84 55 48	3152	83 28 41	3145	82 1 26	3138	80 34 3	3133
3	Regulus W.	83 23 51	2569	85 3 28	2558	86 43 21	2546	88 23 30	2535
	Spica W.	29 21 6	2576	31 0 34	2564	32 40 19	2551	34 20 22	2538
	VENUS E.	65 27 40	2927	63 55 56	2915	62 23 56	2903	60 51 41	2891
	α Aquilæ E.	73 15 50	3119	71 48 3	3118	70 20 15	3119	68 52 28	3121
	SUN E.	110 53 6	2912	109 21 2	2900	107 48 43	2887	106 16 8	2875
4	Spica W.	42 44 59	2475	44 26 47	2463	46 8 52	2450	47 51 15	2438
	JUPITER W.	25 26 8	2563	27 5 54	2558	28 46 14	2547	30 27 4	2497
	VENUS E.	53 6 32	2829	51 32 42	2816	49 58 35	2803	48 24 11	2791
	α Aquilæ E.	61 34 48	3154	60 7 44	3167	58 40 55	3181	57 14 23	3198
	SUN E.	98 29 12	2811	96 54 59	2799	95 20 30	2786	93 45 44	2773
5	Spica W.	56 27 36	2376	58 11 45	2364	59 56 12	2351	61 40 57	2339
	JUPITER W.	38 57 50	2410	40 41 11	2394	42 24 55	2379	44 9 0	2364
	VENUS E.	40 28 2	2726	38 51 57	2714	37 15 36	2701	35 38 58	2688
	SUN E.	85 47 39	2709	84 11 11	2696	82 34 26	2684	80 57 24	2670
6	Spica W.	70 29 2	2280	72 15 31	2259	74 2 16	2258	75 49 18	2246
	JUPITER W.	52 54 34	2296	54 40 40	2283	56 27 4	2270	58 13 47	2259
	Antares W.	24 54 32	2291	26 40 45	2279	28 27 16	2266	30 14 6	2253
	SUN E.	72 47 58	2609	71 9 15	2597	69 30 16	2585	67 51 1	2574
7	Spica W.	84 48 29	2194	86 37 5	2185	88 25 55	2176	90 14 58	2167
	JUPITER W.	67 11 41	2202	69 0 5	2192	70 48 44	2182	72 37 38	2173
	Antares W.	39 12 42	2197	41 1 14	2187	42 50 1	2177	44 39 3	2169
	SUN E.	59 31 2	2522	57 50 19	2513	56 9 24	2504	54 28 16	2495
8	JUPITER W.	81 45 26	2134	83 35 34	2126	85 25 53	2120	87 16 21	2115
	Antares W.	53 47 25	2129	55 37 40	2122	57 28 5	2116	59 18 40	2111
	SATURN W.	38 35 6	2146	40 24 55	2139	42 14 54	2133	44 5 3	2126
	SUN E.	45 59 53	2462	44 17 46	2457	42 35 32	2453	40 53 12	2449
9	Antares W.	68 33 25	2091	70 24 38	2088	72 15 55	2087	74 7 14	2086
	SATURN W.	53 17 52	2105	55 8 44	2103	56 59 39	2101	58 50 37	2099
	SUN E.	32 20 50	2448	30 38 24	2453	28 56 5	2459	27 13 54	2467
13	SUN W.	22 59 50	2735	24 35 43	2741	26 11 28	2749	27 47 3	2759
	Aldebaran E.	54 7 5	2380	52 23 1	2397	50 39 22	2417	48 56 11	2437
	MARS E.	95 4 22	2381	93 20 20	2397	91 36 41	2413	89 53 25	2431
	Pollux E.	95 58 54	2362	94 14 24	2376	92 30 15	2392	90 46 29	2408

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Pollux W.	100 41 51	2724	102 17 59	2714	103 54 20	2706	105 30 52	2696
	Regulus W.	63 47 19	2695	65 24 5	2686	67 1 4	2675	68 38 17	2665
	Antares E.	36 8 45	2689	34 31 50	2680	32 54 43	2671	31 17 24	2663
	SATURN E.	51 4 59	2704	49 28 24	2694	47 51 36	2685	46 14 36	2675
	VENUS E.	83 30 8	3060	82 1 9	3050	80 31 58	3039	79 2 34	3028
	α Aquilæ E.	90 42 39	3185	89 16 12	3176	87 49 34	3168	86 22 46	3159
2	Regulus W.	76 47 51	2612	78 26 29	2602	80 5 21	2591	81 44 29	2580
	SATURN E.	38 6 21	2627	36 28 3	2617	34 49 31	2607	33 10 46	2597
	VENUS E.	71 32 11	2973	70 1 25	2962	68 30 24	2950	66 59 9	2939
	α Aquilæ E.	79 6 34	3129	77 38 59	3124	76 11 19	3122	74 43 36	3119
3	Regulus W.	90 3 54	2524	91 44 34	2512	93 25 30	2501	95 6 42	2489
	Spica W.	36 0 42	2525	37 41 20	2513	39 22 15	2500	41 3 28	2487
	VENUS E.	59 19 11	2879	57 46 25	2867	56 13 24	2854	54 40 6	2842
	α Aquilæ E.	67 24 44	3124	65 57 4	3129	64 29 30	3136	63 2 4	3144
	SUN E.	104 43 17	2862	103 10 10	2850	101 36 47	2838	100 3 8	2825
4	Spica W.	49 33 56	2426	51 16 54	2413	53 0 10	2401	54 43 44	2386
	JUPITER W.	32 8 22	2477	33 50 7	2460	35 32 17	2442	37 14 52	2426
	VENUS E.	46 49 31	2778	45 14 34	2765	43 39 20	2752	42 3 49	2740
	α Aquilæ E.	55 48 12	3218	54 22 24	3242	52 57 5	3269	51 32 17	3301
	SUN E.	92 10 41	2760	90 35 21	2747	88 59 44	2735	87 23 50	2722
5	Spica W.	63 25 59	2327	65 11 19	2315	66 56 56	2304	68 42 50	2291
	JUPITER W.	45 53 26	2350	47 38 13	2336	49 23 20	2322	51 8 47	2309
	VENUS E.	34 2 2	2675	32 24 49	2663	30 47 20	2651	29 9 24	2639
	SUN E.	79 20 4	2657	77 42 27	2646	76 4 34	2633	74 26 24	2621
6	Spica W.	77 36 37	2235	79 24 12	2225	81 12 2	2214	83 0 8	2204
	JUPITER W.	60 0 47	2247	61 48 5	2235	63 35 41	2224	65 23 33	2213
	Antares W.	32 1 15	2241	33 48 41	2229	35 36 25	2218	37 24 25	2207
	SUN E.	66 11 31	2563	64 31 45	2553	62 51 45	2543	61 11 31	2532
7	Spica W.	92 4 15	2159	93 53 44	2151	95 43 26	2143	97 33 19	2136
	JUPITER W.	74 26 46	2165	76 16 7	2155	78 5 42	2147	79 55 29	2141
	Antares W.	46 28 18	2159	48 17 47	2151	50 7 28	2143	51 57 21	2136
	SUN E.	52 46 56	2487	51 5 25	2480	49 23 44	2473	47 41 53	2467
8	JUPITER W.	89 6 58	2110	90 57 42	2105	92 48 33	2101	94 39 30	2098
	Antares W.	61 9 23	2105	63 0 14	2101	64 51 12	2097	66 42 16	2094
	SATURN W.	45 55 22	2121	47 45 49	2116	49 36 24	2112	51 27 5	2108
	SUN E.	39 10 47	2447	37 28 19	2445	35 45 49	2445	34 3 19	2446
9	Antares W.	75 58 35	2086	77 49 56	2086	79 41 17	2087	81 32 36	2088
	SATURN W.	60 41 37	2099	62 32 38	2099	64 23 39	2099	66 14 39	2101
	SUN E.	25 31 54	2478	23 50 10	2492	22 8 45	2509	20 27 44	2530
13	SUN W.	29 22 25	2770	30 57 32	2782	32 32 24	2795	34 6 58	2809
	Aldebaran E.	47 13 29	2458	45 31 16	2478	43 49 32	2500	42 8 19	2523
	MARS E.	88 10 34	2448	86 28 7	2465	84 46 4	2482	83 4 26	2499
	Pollux E.	89 3 6	2425	87 20 7	2441	85 37 31	2459	83 55 20	2476

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
14	SUN W.	35 41 14	2825	37 15 10	2840	38 48 46	2856	40 22 1	2873
	Aldebaran E.	40 27 38	2547	38 47 30	2572	37 7 56	2598	35 28 58	2626
	MARS E.	81 23 12	2518	79 42 24	2535	78 2 0	2553	76 22 1	2572
	Pollux E.	82 13 33	2494	80 32 11	2511	78 51 13	2530	77 10 41	2548
15	SUN W.	48 2 52	2959	49 33 56	2977	51 4 37	2994	52 34 57	3013
	MARS E.	68 8 29	2666	66 31 3	2684	64 54 1	2702	63 17 24	2720
	Pollux E.	68 54 20	2640	67 16 20	2659	65 38 45	2678	64 1 36	2697
16	SUN W.	60 1 5	3101	61 29 14	3117	62 57 3	3133	64 24 32	3151
	MARS E.	55 20 22	2811	53 46 9	2829	52 12 19	2847	50 38 52	2865
	Pollux E.	56 2 8	2792	54 27 29	2811	52 53 15	2830	51 19 26	2848
	Regulus E.	92 44 14	2740	91 8 27	2756	89 33 2	2772	87 57 58	2788
17	SUN W.	71 36 59	3230	73 2 33	3245	74 27 49	3259	75 52 49	3273
	α Arietis W.	32 45 26	2919	34 17 21	2927	35 49 5	2937	37 20 37	2946
	MARS E.	42 57 7	2949	41 25 50	2965	39 54 53	2981	38 24 16	2997
	Pollux E.	43 36 27	2945	42 5 5	2965	40 34 9	2985	39 3 38	3005
	Regulus E.	80 7 38	2862	78 34 31	2877	77 1 43	2891	75 29 12	2904
18	SUN W.	82 53 50	3338	84 17 18	3348	85 40 34	3359	87 3 37	3371
	α Arietis W.	44 55 29	2990	46 25 54	2999	47 56 8	3007	49 26 12	3015
	Regulus E.	67 50 43	2965	66 19 47	2976	64 49 4	2986	63 18 34	2997
19	SUN W.	93 56 0	3415	95 17 59	3423	96 39 49	3431	98 1 31	3437
	α Arietis W.	56 54 9	3051	58 23 19	3057	59 52 21	3062	61 21 17	3068
	Aldebaran W.	24 51 6	3241	26 16 27	3226	27 42 5	3214	29 7 58	3204
	Regulus E.	55 49 5	3041	54 19 43	3049	52 50 31	3056	51 21 28	3064
20	SUN W.	104 48 21	3463	106 9 27	3466	107 30 29	3470	108 51 27	3472
	α Arietis W.	68 44 29	3087	70 12 54	3091	71 41 15	3092	73 9 34	3094
	Aldebaran W.	36 19 47	3173	37 46 29	3169	39 13 15	3166	40 40 5	3162
	Regulus E.	43 58 12	3092	42 29 53	3097	41 1 40	3102	39 33 33	3106
	Spica E.	97 55 16	3069	96 26 28	3072	94 57 44	3074	93 29 3	3076
21	SUN W.	115 35 43	3479	116 56 31	3479	118 17 19	3478	119 38 8	3478
	α Arietis W.	80 30 45	3097	81 58 58	3097	83 27 11	3096	84 55 26	3094
	Aldebaran W.	47 55 17	3146	49 22 31	3142	50 49 50	3138	52 17 13	3134
	Regulus E.	32 14 11	3123	30 46 32	3130	29 18 59	3134	27 51 31	3138
	Spica E.	86 6 6	3081	84 37 33	3080	83 8 59	3079	81 40 24	3078
	JUPITER E.	102 57 57	3069	101 29 9	3069	100 0 21	3067	98 31 31	3065
22	α Arietis W.	92 17 17	3082	93 45 49	3078	95 14 25	3074	96 43 6	3070
	Aldebaran W.	59 35 24	3113	61 3 18	3107	62 31 19	3101	63 59 27	3096
	Spica E.	74 16 57	3066	72 48 6	3062	71 19 10	3058	69 50 9	3054
	JUPITER E.	91 6 43	3052	89 37 35	3048	88 8 22	3044	86 39 4	3039
23	Aldebaran W.	71 21 53	3065	72 50 46	3057	74 19 48	3051	75 48 58	3045
	Pollux W.	29 55 16	3197	31 21 29	3176	32 48 7	3158	34 15 7	3139
	MARS W.	28 7 5	3171	29 33 49	3160	31 0 46	3150	32 27 55	3139
	Spica E.	62 23 39	3028	60 54 1	3022	59 24 15	3016	57 54 22	3009
	JUPITER E.	79 11 4	3014	77 41 8	3007	76 11 4	3001	74 40 53	2994

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
14	SUN W.	41 54 55	2890	43 27 27	2906	44 59 38	2924	46 31 26	2942
	Aldebaran E.	33 50 38	2655	32 12 57	2686	30 35 58	2718	28 59 42	2752
	MARS E.	74 42 28	2591	73 3 20	2610	71 24 38	2628	69 46 21	2646
	Pollux E.	75 30 34	2566	73 50 52	2585	72 11 36	2603	70 32 45	2622
15	SUN W.	54 4 54	3030	55 34 29	3047	57 3 43	3065	58 32 35	3083
	MARS E.	61 41 11	2739	60 5 23	2757	58 29 59	2775	56 54 59	2793
	Pollux E.	62 24 52	2716	60 48 33	2735	59 12 40	2754	57 37 12	2772
16	SUN W.	65 51 40	3168	67 18 28	3183	68 44 57	3199	70 11 7	3214
	MARS E.	49 5 48	2882	47 33 6	2898	46 0 45	2915	44 28 45	2932
	Pollux E.	49 46 1	2868	48 13 1	2887	46 40 25	2906	45 8 14	2925
	Regulus E.	86 23 14	2804	84 48 51	2818	83 14 47	2834	81 41 3	2848
17	SUN W.	77 17 32	3287	78 41 59	3300	80 6 11	3313	81 30 8	3325
	α Arietis W.	38 51 58	2954	40 23 8	2964	41 54 6	2973	43 24 53	2981
	MARS E.	36 54 0	3014	35 24 4	3030	33 54 28	3045	32 25 11	3061
	Pollux E.	37 33 32	3027	36 3 53	3049	34 34 41	3072	33 5 57	3096
	Regulus E.	73 56 58	2917	72 25 1	2930	70 53 20	2942	69 21 54	2954
18	SUN W.	88 26 27	3380	89 49 6	3390	91 11 34	3399	92 33 52	3408
	α Arietis W.	50 56 6	3023	52 25 50	3030	53 55 25	3038	55 24 51	3044
	Regulus E.	61 48 17	3006	60 18 12	3016	58 48 19	3025	57 18 37	3033
19	SUN W.	99 23 6	3443	100 44 34	3449	102 5 55	3454	103 27 11	3459
	α Arietis W.	62 50 6	3073	64 18 49	3077	65 47 27	3081	67 16 0	3084
	Aldebaran W.	30 34 3	3195	32 0 18	3188	33 26 41	3183	34 53 11	3178
	Regulus E.	49 52 34	3070	48 23 48	3076	46 55 9	3082	45 26 37	3087
20	SUN W.	110 12 22	3475	111 33 14	3476	112 54 5	3477	114 14 55	3479
	α Arietis W.	74 37 51	3096	76 6 6	3096	77 34 20	3097	79 2 33	3098
	Aldebaran W.	42 7 0	3158	43 33 59	3156	45 1 1	3153	46 28 7	3149
	Regulus E.	38 5 31	3110	36 37 34	3114	35 9 42	3118	33 41 54	3122
	Spica E.	92 0 24	3078	90 31 48	3079	89 3 13	3080	87 34 39	3081
21	SUN W.	120 58 57	3476	122 19 48	3475	123 40 40	3472	125 1 35	3470
	α Arietis W.	86 23 43	3092	87 52 2	3090	89 20 24	3087	90 48 49	3085
	Aldebaran W.	53 44 41	3130	55 12 14	3126	56 39 52	3122	58 7 35	3117
	Regulus E.	26 24 8	3144	24 56 52	3151	23 29 44	3159	22 2 46	3169
	Spica E.	80 11 48	3077	78 43 10	3074	77 14 29	3072	75 45 45	3069
	JUPITER E.	97 2 39	3064	95 33 45	3061	94 4 48	3058	92 35 47	3056
22	α Arietis W.	98 11 52	3065	99 40 44	3061	101 9 41	3056	102 38 45	3050
	Aldebaran W.	65 27 41	3091	66 56 2	3084	68 24 31	3078	69 53 8	3071
	Spica E.	68 21 3	3049	66 51 51	3045	65 22 34	3039	63 53 10	3034
	JUPITER E.	85 9 40	3035	83 40 11	3030	82 10 35	3025	80 40 53	3019
23	Aldebaran W.	77 18 17	3036	78 47 45	3028	80 17 23	3021	81 47 10	3012
	Pollux W.	35 42 29	3123	37 10 11	3107	38 38 12	3091	40 6 32	3078
	MARS W.	33 55 17	3129	35 22 51	3119	36 50 37	3109	38 18 36	3100
	Spica E.	56 24 20	3002	54 54 10	2995	53 23 51	2989	51 53 24	2981
	JUPITER E.	73 10 33	2988	71 40 5	2981	70 9 29	2974	68 38 44	2966



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
24	Aldebaran W.	83 17 8	3004	84 47 16	2996	86 17 34	2987	87 48 3	2979
	Pollux W.	41 35 9	3064	43 4 3	3050	44 33 14	3037	46 2 41	3025
	MARS W.	39 46 46	3090	41 15 8	3080	42 43 42	3070	44 12 28	3060
	Spica E.	50 22 47	2973	48 52 1	2965	47 21 5	2958	45 50 0	2950
	JUPITER E.	67 7 49	2959	65 36 45	2952	64 5 32	2944	62 34 9	2936
	Antares E.	95 57 27	2969	94 26 35	2961	92 55 33	2952	91 24 20	2944
25	Aldebaran W.	95 23 9	2935	96 54 44	2926	98 26 30	2917	99 58 27	2908
	Pollux W.	53 33 47	2963	55 4 46	2952	56 35 59	2940	58 7 27	2929
	MARS W.	51 39 19	3011	53 9 18	3001	54 39 29	2992	56 9 52	2981
	Spica E.	38 11 58	2909	36 39 50	2901	35 7 32	2893	33 35 4	2884
	JUPITER E.	54 54 44	2897	53 22 21	2888	51 49 47	2880	50 17 3	2873
	Antares E.	83 45 33	2900	82 13 14	2891	80 40 43	2881	79 8 0	2872
	SATURN E.	99 27 0	2904	97 54 46	2895	96 22 21	2886	94 49 44	2876
26	Pollux W.	65 48 21	2873	67 21 14	2862	68 54 21	2852	70 27 42	2841
	MARS W.	63 44 56	2931	65 16 35	2922	66 48 26	2912	68 20 30	2902
	Regulus W.	28 46 2	2877	30 18 50	2862	31 51 58	2848	33 25 24	2835
	JUPITER E.	42 30 56	2835	40 57 14	2829	39 23 24	2823	37 49 26	2817
	Antares E.	71 21 24	2825	69 47 28	2815	68 13 20	2805	66 38 59	2795
	SATURN E.	87 3 33	2828	85 29 41	2818	83 55 37	2808	82 21 20	2798
27	Pollux W.	78 17 51	2789	79 52 33	2779	81 27 28	2769	83 2 36	2760
	MARS W.	76 3 58	2853	77 37 17	2843	79 10 49	2834	80 44 33	2825
	Regulus W.	41 16 42	2773	42 51 45	2763	44 27 2	2751	46 2 34	2741
	Antares E.	58 44 6	2749	57 8 31	2739	55 32 43	2730	53 56 43	2720
	SATURN E.	74 26 44	2750	72 51 11	2741	71 15 25	2731	69 39 26	2722
28	Pollux W.	91 1 24	2713	92 37 47	2704	94 14 21	2695	95 51 7	2687
	MARS W.	88 36 16	2778	90 11 13	2769	91 46 21	2760	93 21 41	2751
	Regulus W.	54 3 46	2689	55 40 41	2678	57 17 50	2669	58 55 12	2660
	Antares E.	45 53 39	2675	44 16 26	2667	42 39 2	2659	41 1 27	2650
	SATURN E.	61 36 26	2675	59 59 13	2666	58 21 48	2657	56 44 10	2649
	α Aquilæ E.	99 19 36	3180	97 53 3	3167	96 26 14	3154	94 59 10	3143
29	Regulus W.	67 5 9	2614	68 43 45	2604	70 22 34	2596	72 1 35	2588
	SATURN E.	48 33 7	2606	46 54 20	2597	45 15 21	2590	43 36 12	2582
	α Aquilæ E.	87 40 42	3098	86 12 30	3091	84 44 9	3085	83 15 41	3080
30	Regulus W.	80 19 31	2546	81 59 40	2538	83 40 0	2530	85 20 31	2523
	Spica W.	26 16 43	2555	27 56 40	2545	29 36 51	2535	31 17 15	2526
	SATURN E.	35 17 47	2544	33 37 35	2538	31 57 14	2531	30 16 44	2525
	α Aquilæ E.	75 52 13	3069	74 23 26	3061	72 54 41	3073	71 25 58	3076
	VENUS E.	98 58 32	2937	97 27 0	2928	95 55 17	2920	94 23 24	2912
	Fomalhaut E.	101 28 2	2992	99 57 39	2979	98 27 0	2968	96 56 7	2957
31	Regulus W.	93 45 44	2486	95 27 17	2478	97 9 1	2471	98 50 55	2464
	Spica W.	39 42 24	2483	41 24 1	2475	43 5 50	2467	44 47 50	2459
	α Aquilæ E.	64 3 59	3114	62 36 7	3128	61 8 31	3142	59 41 12	3159
	VENUS E.	86 41 24	2873	85 8 30	2866	83 35 27	2857	82 2 13	2850
	Fomalhaut E.	89 18 36	2914	87 46 35	2908	86 14 26	2902	84 42 10	2894
	SUN E.	128 19 56	2826	126 46 2	2818	125 11 57	2808	123 37 40	2800

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
24	Aldebaran W.	89 18 42	2970	90 49 32	2962	92 20 33	2953	93 51 45	2943
	Pollux W.	47 32 23	3012	49 2 21	2999	50 32 35	2958	52 3 3	2975
	MARS W.	45 41 26	3051	47 10 36	3041	48 39 58	3031	50 9 32	3021
	Spica E.	44 18 44	2942	42 47 18	2934	41 15 42	2925	39 43 55	2917
	JUPITER E.	61 2 36	2928	59 30 53	2920	57 59 0	2912	56 26 57	2905
	Antares E.	89 52 57	2935	88 21 23	2926	86 49 37	2918	85 17 41	2909
25	Aldebaran W.	101 30 36	2899	103 2 56	2890	104 35 28	2880	106 8 12	2872
	Pollux W.	59 39 9	2917	61 11 6	2906	62 43 17	2895	64 15 42	2884
	MARS W.	57 40 28	2972	59 11 16	2962	60 42 17	2952	62 13 30	2942
	Spica E.	32 2 25	2877	30 29 37	2869	28 56 38	2862	27 23 30	2853
	JUPITER E.	48 44 9	2865	47 11 5	2858	45 37 52	2850	44 4 29	2842
	Antares E.	77 35 5	2862	76 1 58	2853	74 28 39	2844	72 55 8	2834
	SATURN E.	93 16 54	2866	91 43 52	2857	90 10 38	2848	88 37 12	2838
26	Pollux W.	72 1 17	2831	73 35 5	2820	75 9 7	2810	76 43 22	2799
	MARS W.	69 52 46	2892	71 25 15	2882	72 57 57	2873	74 30 51	2862
	Regulus W.	34 59 7	2821	36 33 7	2809	38 7 23	2797	39 41 55	2785
	JUPITER E.	36 15 20	2812	34 41 8	2807	33 6 49	2803	31 32 25	2800
	Antares E.	65 4 25	2786	63 29 39	2776	61 54 40	2767	60 19 29	2758
	SATURN E.	80 46 50	2788	79 12 7	2779	77 37 12	2769	76 2 4	2760
27	Pollux W.	84 37 56	2751	86 13 29	2741	87 49 15	2732	89 25 13	2722
	MARS W.	82 18 29	2815	83 52 37	2805	85 26 58	2796	87 1 31	2787
	Regulus W.	47 38 20	2730	49 14 20	2719	50 50 35	2708	52 27 4	2698
	Antares E.	52 20 30	2712	50 44 6	2702	49 7 29	2693	47 30 40	2684
	SATURN E.	68 3 15	2712	66 26 51	2703	64 50 15	2694	63 13 27	2684
28	Pollux W.	97 28 5	2678	99 5 14	2669	100 42 35	2661	102 20 7	2654
	MARS W.	94 57 13	2743	96 32 56	2734	98 8 51	2725	99 44 57	2717
	Regulus W.	60 32 46	2650	62 10 33	2640	63 48 33	2632	65 26 45	2623
	Antares E.	39 23 40	2642	37 45 42	2635	36 7 34	2626	34 29 15	2618
	SATURN E.	55 6 21	2640	53 28 20	2631	51 50 7	2623	50 11 43	2614
	α Aquilæ E.	93 31 52	3132	92 4 21	3123	90 36 39	3113	89 8 45	3105
29	Regulus W.	73 40 47	2579	75 20 11	2571	76 59 46	2562	78 39 33	2554
	SATURN E.	41 56 52	2574	40 17 21	2566	38 37 40	2559	36 57 49	2551
	α Aquilæ E.	81 47 7	3076	80 18 28	3073	78 49 45	3071	77 21 0	3069
30	Regulus W.	87 1 12	2515	88 42 4	2507	90 23 7	2500	92 4 20	2492
	Spica W.	32 57 52	2517	34 38 42	2508	36 19 44	2499	38 0 58	2491
	SATURN E.	28 36 5	2519	26 55 18	2513	25 14 23	2507	23 33 20	2502
	α Aquilæ E.	69 57 19	3081	68 28 46	3087	67 0 20	3095	65 32 4	3104
	VENUS E.	92 51 20	2904	91 19 6	2896	89 46 42	2888	88 14 8	2880
	Fomalhaut E.	95 25 0	2947	93 53 41	2938	92 22 10	2929	90 50 28	2921
31	Regulus W.	100 32 59	2457	102 15 13	2450	103 57 36	2443	105 40 9	2437
	Spica W.	46 30 1	2451	48 12 23	2444	49 54 55	2436	51 37 38	2429
	α Aquilæ E.	58 14 14	3178	56 47 39	3201	55 21 31	3226	53 55 53	3257
	VENUS E.	80 28 50	2842	78 55 17	2835	77 21 35	2828	75 47 43	2821
	Fomalhaut E.	83 9 49	2894	81 37 22	2891	80 4 52	2889	78 32 19	2887
	SUN E.	122 3 12	2792	120 28 33	2783	118 53 43	2775	117 18 42	2766

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Subtracted from Apparent Time.			
Sat.	1	<sup>h</sup> <sup>m</sup> <sup>s</sup> 0 42 28.37	<sup>s</sup> 9.099	<sup>°</sup> <sup>'</sup> <sup>"</sup> N. 4 34 13.5	<sup>"</sup> +57.83	<sup>'</sup> <sup>"</sup> 16 2.18	<sup>s</sup> 64.52	<sup>m</sup> <sup>s</sup> 3 57.04	<sup>s</sup> 0.755	
SUN.	2	0 46 6.81	9.105	4 57 19.0	57.62	16 1.90	64.54	3 38.98	0.749	
Mon.	3	0 49 45.39	9.111	5 20 19.3	57.40	16 1.62	64.56	3 21.06	0.743	
Tues.	4	0 53 24.14	9.118	5 43 14.2	+57.16	16 1.34	64.58	3 3.30	0.736	
Wed.	5	0 57 3.07	9.126	6 6 3.1	56.91	16 1.06	64.61	2 45.73	0.728	
Thur.	6	1 0 42.20	9.135	6 28 45.9	56.64	16 0.78	64.64	2 28.36	0.719	
Frid.	7	1 4 21.56	9.145	6 51 22.0	+56.36	16 0.50	64.67	2 11.20	0.710	
Sat.	8	1 8 1.14	9.155	7 13 51.2	56.06	16 0.22	64.70	1 54.28	0.700	
SUN.	9	1 11 40.97	9.165	7 36 13.0	55.75	15 59.94	64.74	1 37.60	0.689	
Mon.	10	1 15 21.06	9.176	7 58 27.2	+55.42	15 59.67	64.78	1 21.18	0.678	
Tues.	11	1 19 1.43	9.188	8 20 33.3	55.08	15 59.40	64.82	1 5.05	0.667	
Wed.	12	1 22 42.09	9.200	8 42 31.0	54.72	15 59.13	64.86	0 49.19	0.655	
Thur.	13	1 26 23.04	9.213	9 4 19.9	+54.35	15 58.86	64.91	0 33.64	0.642	
Frid.	14	1 30 4.31	9.226	9 25 59.8	53.96	15 58.60	64.96	0 18.39	0.629	
Sat.	15	1 33 45.91	9.240	9 47 30.2	53.56	15 58.34	65.01	0 3.47	0.615	
SUN.	16	1 37 27.84	9.254	10 8 50.8	+53.15	15 58.08	65.07	0 11.10	0.600	
Mon.	17	1 41 10.13	9.269	10 30 1.2	52.72	15 57.82	65.12	0 25.33	0.585	
Tues.	18	1 44 52.78	9.285	10 51 1.2	52.28	15 57.56	65.18	0 39.20	0.570	
Wed.	19	1 48 35.81	9.301	11 11 50.4	+51.82	15 57.30	65.23	0 52.69	0.554	
Thur.	20	1 52 19.23	9.318	11 32 28.5	51.35	15 57.05	65.28	1 5.78	0.537	
Frid.	21	1 56 3.07	9.335	11 52 55.2	50.86	15 56.79	65.33	1 18.46	0.520	
Sat.	22	1 59 47.33	9.353	12 13 10.1	+50.37	15 56.54	65.39	1 30.72	0.502	
SUN.	23	2 3 32.03	9.372	12 33 13.1	49.86	15 56.29	65.46	1 42.55	0.483	
Mon.	24	2 7 17.18	9.391	12 53 3.6	49.34	15 56.04	65.54	1 53.92	0.464	
Tues.	25	2 11 2.81	9.411	13 12 41.6	+48.81	15 55.79	65.62	2 4.82	0.444	
Wed.	26	2 14 48.92	9.432	13 32 6.5	48.27	15 55.54	65.70	2 15.23	0.424	
Thur.	27	2 18 35.53	9.453	13 51 18.2	47.71	15 55.29	65.77	2 25.14	0.403	
Frid.	28	2 22 22.66	9.475	14 10 16.4	+47.14	15 55.04	65.85	2 34.55	0.381	
Sat.	29	2 26 10.31	9.497	14 29 0.6	46.55	15 54.79	65.92	2 43.43	0.359	
SUN.	30	2 29 58.50	9.519	14 47 30.6	45.95	15 54.55	66.00	2 51.77	0.336	
Mon.	31	2 33 47.24	9.542	N. 15 5 46.1	+45.34	15 54.30	66.07	2 59.56	0.313	

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
		h m s	s	° ' "	"	m s	s	h m s
Sat.	1	0 42 27.77	9.101	N. 4 34 9.7	+57.84	3 57.09	0.756	0 38 30.68
SUN.	2	0 46 6.25	9.107	4 57 15.5	57.63	3 39.02	0.750	0 42 27.23
Mon.	3	0 49 44.88	9.113	5 20 16.1	57.41	3 21.10	0.743	0 46 23.78
Tues.	4	0 53 23.67	9.120	5 43 11.3	+57.17	3 3.34	0.736	0 50 20.34
Wed.	5	0 57 2.65	9.128	6 6 0.5	56.92	2 45.76	0.728	0 54 16.89
Thur.	6	1 0 41.83	9.137	6 28 43.5	56.65	2 28.39	0.719	0 58 13.44
Frid.	7	1 4 21.22	9.146	6 51 20.0	+56.37	2 11.23	0.710	1 2 10.00
Sat.	8	1 8 0.85	9.156	7 13 49.4	56.07	1 54.30	0.700	1 6 6.55
SUN.	9	1 11 40.72	9.167	7 36 11.5	55.76	1 37.62	0.690	1 10 3.10
Mon.	10	1 15 20.86	9.178	7 58 25.9	+55.43	1 21.20	0.679	1 13 59.66
Tues.	11	1 19 1.27	9.190	8 20 32.3	55.09	1 5.06	0.667	1 17 56.21
Wed.	12	1 22 41.96	9.202	8 42 30.3	54.73	0 49.20	0.655	1 21 52.76
Thur.	13	1 26 22.96	9.215	9 4 19.5	+54.36	0 33.64	0.642	1 25 49.32
Frid.	14	1 30 4.27	9.228	9 25 59.6	53.97	0 18.40	0.629	1 29 45.87
Sat.	15	1 33 45.90	9.242	9 47 30.2	53.57	0 3.48	0.615	1 33 42.42
SUN.	16	1 37 27.87	9.256	10 8 51.0	+53.16	0 11.11	0.600	1 37 38.98
Mon.	17	1 41 10.20	9.271	10 30 1.6	52.73	0 25.34	0.585	1 41 35.53
Tues.	18	1 44 52.88	9.287	10 51 1.8	52.29	0 39.21	0.570	1 45 32.08
Wed.	19	1 48 35.94	9.303	11 11 51.2	+51.83	0 52.69	0.554	1 49 28.64
Thur.	20	1 52 19.40	9.320	11 32 29.5	51.36	1 5.79	0.537	1 53 25.19
Frid.	21	1 56 3.27	9.337	11 52 56.3	50.87	1 18.48	0.520	1 57 21.75
Sat.	22	1 59 47.56	9.355	12 13 11.4	+50.38	1 30.74	0.502	2 1 18.30
SUN.	23	2 3 32.30	9.373	12 33 14.5	49.87	1 42.56	0.483	2 5 14.86
Mon.	24	2 7 17.48	9.392	12 53 5.2	49.35	1 53.93	0.464	2 9 11.41
Tues.	25	2 11 3.14	9.412	13 12 43.3	+48.82	2 4.83	0.444	2 13 7.96
Wed.	26	2 14 49.27	9.433	13 32 8.4	48.27	2 15.24	0.424	2 17 4.52
Thur.	27	2 18 35.91	9.454	13 51 20.2	47.71	2 25.16	0.403	2 21 1.07
Frid.	28	2 22 23.06	9.476	14 10 18.4	+47.14	2 34.57	0.381	2 24 57.63
Sat.	29	2 26 10.74	9.498	14 29 2.7	46.55	2 43.44	0.359	2 28 54.18
SUN.	30	2 29 58.95	9.520	14 47 32.9	45.95	2 51.79	0.336	2 32 50.74
Mon.	31	2 33 47.71	9.543	N. 15 5 48.4	+45.34	2 59.58	0.313	2 36 47.29

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
 The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,  
 +9°.8565.  
 (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	91	11 33 9.5	32 40.2	147.86	— 0.13	9.9999154	+53.2	h m s 23 17 39.72
2	92	12 32 17.3	31 48.0	147.78	0.00	0.0000433	53.2	23 13 43.82
3	93	13 31 23.3	30 53.9	147.71	+ 0.13	0.0001711	53.2	23 9 47.91
4	94	14 30 27.6	29 58.1	147.64	+ 0.26	0.0002989	+53.1	23 5 52.00
5	95	15 29 30.1	29 0.5	147.57	0.37	0.0004262	52.9	23 1 56.09
6	96	16 28 30.8	28 1.1	147.50	0.46	0.0005532	52.7	22 58 0.19
7	97	17 27 29.7	26 59.9	147.42	+ 0.53	0.0006795	+52.5	22 54 4.28
8	98	18 26 26.8	25 56.9	147.34	0.56	0.0008051	52.2	22 50 8.37
9	99	19 25 22.0	24 52.0	147.26	0.57	0.0009297	51.8	22 46 12.46
10	100	20 24 15.2	23 45.1	147.18	+ 0.55	0.0010535	+51.4	22 42 16.56
11	101	21 23 6.4	22 36.2	147.09	0.50	0.0011763	51.0	22 38 20.65
12	102	22 21 55.6	21 25.2	147.01	0.43	0.0012981	50.6	22 34 24.74
13	103	23 20 42.7	20 12.2	146.92	+ 0.31	0.0014188	+50.2	22 30 28.84
14	104	24 19 27.6	18 57.0	146.83	0.19	0.0015387	49.8	22 26 32.93
15	105	25 18 10.3	17 39.5	146.73	+ 0.07	0.0016576	49.4	22 22 37.02
16	106	26 16 50.9	16 20.0	146.64	— 0.06	0.0017756	+49.0	22 18 41.11
17	107	27 15 29.3	14 58.3	146.55	0.20	0.0018928	48.7	22 14 45.20
18	108	28 14 5.2	13 34.1	146.45	0.33	0.0020094	48.4	22 10 49.30
19	109	29 12 39.1	12 7.9	146.36	— 0.43	0.0021256	+48.2	22 6 53.39
20	110	30 11 10.8	10 39.5	146.27	0.51	0.0022410	48.0	22 2 57.48
21	111	31 9 40.2	9 8.7	146.19	0.58	0.0023561	47.9	21 59 1.57
22	112	32 8 7.7	7 36.1	146.10	— 0.62	0.0024711	+47.8	21 55 5.66
23	113	33 6 33.1	6 1.4	146.02	0.61	0.0025853	47.7	21 51 9.75
24	114	34 4 56.5	4 24.7	145.94	0.58	0.0026996	47.6	21 47 13.84
25	115	35 3 18.1	2 46.2	145.86	— 0.53	0.0028136	+47.5	21 43 17.94
26	116	36 1 37.8	1 5.7	145.78	0.45	0.0029274	47.4	21 39 22.03
27	117	36 59 55.7	59 23.5	145.71	0.34	0.0030408	47.2	21 35 26.12
28	118	37 58 12.0	57 39.7	145.64	— 0.22	0.0031538	+47.0	21 31 30.21
29	119	38 56 26.7	55 54.2	145.58	— 0.10	0.0032663	46.8	21 27 34.30
30	120	39 54 39.9	54 7.3	145.51	+ 0.04	0.0033782	46.5	21 23 38.39
31	121	40 52 51.6	52 18.9	145.45	+ 0.17	0.0034894	+46.1	21 19 42.48
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0.0.								Diff. for 1 Hour, —9 <sup>s</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	
	' "	' "	' "	"	' "	"	h m	m	d
1	15 56.0	15 59.3	58 21.8	+1.03	58 34.0	+0.99	16 59.2	2.46	20.7
2	16 2.4	16 5.4	58 45.6	0.94	58 56.5	0.88	17 58.1	2.43	21.7
3	16 8.1	16 10.7	59 6.6	0.80	59 15.8	0.72	18 55.5	2.35	22.7
4	16 12.8	16 14.7	59 23.8	+0.62	59 30.6	+0.49	19 50.7	2.25	23.7
5	16 16.1	16 17.0	59 35.7	0.35	59 39.0	+0.19	20 43.6	2.16	24.7
6	16 17.3	16 17.1	59 40.3	+0.02	59 39.4	-0.18	21 34.8	2.11	25.7
7	16 16.2	16 14.6	59 36.1	-0.38	59 30.2	-0.60	22 25.0	2.08	26.7
8	16 12.3	16 9.3	59 21.8	0.81	59 10.8	1.02	23 15.1	2.10	27.7
9	16 5.6	16 1.4	58 57.3	1.21	58 41.7	1.39	0		28.7
10	15 56.5	15 51.3	58 23.9	-1.54	58 4.6	-1.66	0 5.9	2.14	0.2
11	15 45.7	15 39.8	57 44.1	1.75	57 22.6	1.81	0 57.7	2.18	1.2
12	15 33.9	15 27.9	57 0.7	1.83	56 38.8	1.80	1 50.6	2.22	2.2
13	15 22.1	15 16.4	56 17.3	-1.75	55 56.6	-1.67	2 44.0	2.22	3.2
14	15 11.1	15 6.2	55 37.1	1.56	55 19.2	1.42	3 37.0	2.19	4.2
15	15 1.8	14 58.0	55 3.0	1.26	54 48.9	1.08	4 28.7	2.11	5.2
16	14 54.7	14 52.2	54 37.0	-0.89	54 27.5	-0.68	5 18.2	2.01	6.2
17	14 50.3	14 49.1	54 20.6	0.47	54 16.2	-0.25	6 5.3	1.91	7.2
18	14 48.6	14 48.8	54 14.4	-0.04	54 15.3	+0.18	6 50.2	1.83	8.2
19	14 49.8	14 51.3	54 18.7	+0.38	54 24.5	+0.58	7 33.3	1.77	9.2
20	14 53.6	14 56.4	54 32.7	0.78	54 43.2	0.95	8 15.4	1.74	10.2
21	14 59.8	15 3.7	54 55.6	1.11	55 9.8	1.25	8 57.3	1.75	11.2
22	15 8.0	15 12.6	55 25.6	+1.37	55 42.6	+1.46	9 40.0	1.81	12.2
23	15 17.5	15 22.6	56 0.6	1.53	56 19.2	1.56	10 24.3	1.90	13.2
24	15 27.7	15 32.9	56 38.2	1.58	56 57.1	1.56	11 11.3	2.03	14.2
25	15 38.0	15 42.8	57 15.7	+1.52	57 33.5	+1.45	12 1.7	2.18	15.2
26	15 47.4	15 51.7	57 50.5	1.36	58 6.3	1.25	12 55.9	2.33	16.2
27	15 55.8	15 59.2	58 20.7	1.13	58 33.6	1.00	13 53.4	2.45	17.2
28	16 2.2	16 4.8	58 44.8	+0.87	58 54.4	+0.73	14 53.0	2.50	18.2
29	16 6.9	16 8.7	59 2.2	0.59	59 8.5	0.45	15 52.8	2.47	19.2
30	16 9.9	16 10.8	59 13.1	0.32	59 16.2	+0.20	16 51.1	2.38	20.2
31	16 11.2	16 11.3	59 17.9	+0.08	59 18.2	-0.03	17 46.8	2.26	21.2

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 1.					MONDAY 3.				
0	h m s		° ' "	"	0	h m s		° ' "	"
1	16 57 40.95	2.5121	S. 24 10 43.1	0.794	1	18 58 29.97	2.4850	S. 21 50 9.1	6.555
2	17 0 11.73	2.5138	24 11 26.1	0.639	2	19 0 58.99	2.4822	21 43 31.5	6.698
3	17 2 42.61	2.5156	24 11 59.8	0.485	3	19 3 27.84	2.4794	21 36 45.3	6.840
4	17 5 13.60	2.5173	24 12 24.3	0.330	4	19 5 56.52	2.4767	21 29 50.7	6.980
5	17 7 44.68	2.5187	24 12 39.4	0.174	5	19 8 25.04	2.4738	21 22 47.7	7.119
6	17 10 15.84	2.5200	24 12 45.2	- 0.019	6	19 10 53.38	2.4708	21 15 36.4	7.258
7	17 12 47.08	2.5213	24 12 41.7	+ 0.137	7	19 13 21.54	2.4678	21 8 16.8	7.396
8	17 15 18.40	2.5225	24 12 28.8	0.293	8	19 15 49.52	2.4648	21 0 48.9	7.533
9	17 17 49.78	2.5236	24 12 6.6	0.449	9	19 18 17.31	2.4617	20 53 12.8	7.669
10	17 20 21.23	2.5246	24 11 34.9	0.606	10	19 20 44.92	2.4586	20 45 28.6	7.803
11	17 22 52.73	2.5254	24 10 53.9	0.764	11	19 23 12.34	2.4553	20 37 36.4	7.938
12	17 25 24.28	2.5262	24 10 3.5	0.918	12	19 25 39.56	2.4521	20 29 36.1	8.071
13	17 27 55.87	2.5268	24 9 3.7	1.075	13	19 28 6.59	2.4488	20 21 27.9	8.203
14	17 30 27.50	2.5273	24 7 54.5	1.232	14	19 30 33.42	2.4455	20 13 11.8	8.333
15	17 32 59.15	2.5278	24 6 35.9	1.388	15	19 33 0.05	2.4422	20 4 47.9	8.463
16	17 35 30.83	2.5282	24 5 7.9	1.545	16	19 35 26.48	2.4388	19 56 16.2	8.592
17	17 38 2.53	2.5285	24 3 30.5	1.702	17	19 37 52.70	2.4353	19 47 36.9	8.719
18	17 40 34.23	2.5284	24 1 43.7	1.859	18	19 40 18.72	2.4319	19 38 49.9	8.846
19	17 43 5.94	2.5285	23 59 47.4	2.016	19	19 42 44.53	2.4284	19 29 55.4	8.972
20	17 45 37.65	2.5284	23 57 41.8	2.172	20	19 45 10.13	2.4248	19 20 53.3	9.097
21	17 48 9.35	2.5282	23 55 26.8	2.328	21	19 47 35.51	2.4213	19 11 43.8	9.219
22	17 50 41.03	2.5278	23 53 2.4	2.484	22	19 50 0.68	2.4178	19 2 27.0	9.341
23	17 53 12.69	2.5275	23 50 28.7	2.640	23	19 52 25.64	2.4142	18 53 2.9	9.463
24	17 55 44.33	2.5271	S. 23 47 45.6	2.797	24	19 54 50.38	2.4105	S. 18 43 31.5	9.583
SUNDAY 2.					TUESDAY 4.				
0	h m s		° ' "	"	0	h m s		° ' "	"
1	17 58 15.94	2.5265	S. 23 44 53.1	2.953	1	19 57 14.90	2.4068	S. 18 33 52.9	9.702
2	18 0 47.51	2.5258	23 41 51.3	3.108	2	19 59 39.20	2.4033	18 24 7.3	9.818
3	18 3 19.03	2.5249	23 38 40.2	3.263	3	20 2 3.29	2.3996	18 14 14.7	9.935
4	18 5 50.50	2.5240	23 35 19.7	3.418	4	20 4 27.15	2.3958	18 4 15.1	10.050
5	18 8 21.91	2.5230	23 31 50.0	3.573	5	20 6 50.79	2.3922	17 54 8.7	10.163
6	18 10 53.26	2.5220	23 28 11.0	3.727	6	20 9 14.21	2.3885	17 43 55.5	10.276
7	18 13 24.55	2.5208	23 24 22.8	3.880	7	20 11 37.41	2.3848	17 33 35.6	10.387
8	18 15 55.76	2.5195	23 20 25.4	4.033	8	20 14 0.38	2.3810	17 23 9.1	10.497
9	18 18 26.89	2.5181	23 16 18.8	4.187	9	20 16 23.13	2.3773	17 12 36.0	10.606
10	18 20 57.93	2.5167	23 12 3.0	4.339	10	20 18 45.66	2.3737	17 1 56.4	10.713
11	18 23 28.89	2.5152	23 7 38.1	4.491	11	20 21 7.97	2.3699	16 51 10.4	10.820
12	18 25 59.75	2.5134	23 3 4.1	4.643	12	20 23 30.05	2.3661	16 40 18.0	10.924
13	18 28 30.50	2.5117	22 58 21.0	4.793	13	20 25 51.90	2.3623	16 29 19.5	11.027
14	18 31 1.15	2.5099	22 53 28.9	4.944	14	20 28 13.53	2.3587	16 18 14.8	11.129
15	18 33 31.69	2.5081	22 48 27.7	5.094	15	20 30 34.95	2.3551	16 7 4.0	11.231
16	18 36 2.12	2.5062	22 43 17.6	5.243	16	20 32 56.14	2.3513	15 55 47.1	11.330
17	18 38 32.43	2.5041	22 37 58.6	5.392	17	20 35 17.11	2.3476	15 44 24.4	11.428
18	18 41 2.61	2.5019	22 32 30.6	5.540	18	20 37 37.85	2.3439	15 32 55.8	11.525
19	18 43 32.66	2.4997	22 26 53.8	5.688	19	20 39 58.38	2.3403	15 21 21.4	11.621
20	18 46 2.57	2.4974	22 21 8.1	5.834	20	20 42 18.69	2.3367	15 9 41.3	11.715
21	18 48 32.35	2.4951	22 15 13.7	5.980	21	20 44 38.78	2.3330	14 57 55.6	11.808
22	18 51 1.98	2.4926	22 9 10.5	6.126	22	20 46 58.65	2.3294	14 46 4.4	11.899
23	18 53 31.46	2.4901	22 2 58.6	6.270	23	20 49 18.31	2.3259	14 34 7.7	11.989
24	18 56 0.79	2.4876	21 56 38.1	6.413	24	20 51 37.76	2.3223	14 22 5.7	12.078
	18 58 29.97	2.4850	S. 21 50 9.1	6.555		20 53 56.99	2.3188	S. 14 9 58.4	12.164

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 5.					FRIDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	20 53 56.99	2.3188	S. 14 9 58.4	12.164	1	22 41 50.79	2.1948	S. 3 13 19.0	14.624
2	20 56 16.01	2.3158	13 57 46.0	12.250	2	22 44 2.44	2.1935	2 58 41.1	14.639
3	20 58 34.81	2.3117	13 45 28.4	12.335	3	22 46 14.01	2.1923	2 44 2.3	14.652
4	21 0 53.41	2.3083	13 33 5.8	12.418	4	22 48 25.51	2.1910	2 29 22.8	14.663
5	21 3 11.80	2.3048	13 20 38.3	12.498	5	22 50 36.93	2.1898	2 14 42.7	14.673
6	21 5 29.98	2.3013	13 8 6.0	12.578	6	22 52 48.29	2.1888	2 0 2.0	14.682
7	21 7 47.96	2.2980	12 55 28.9	12.658	7	22 54 59.59	2.1878	1 45 20.9	14.688
8	21 10 5.74	2.2946	12 42 47.1	12.735	8	22 57 10.82	2.1868	1 30 39.4	14.694
9	21 12 23.31	2.2913	12 30 0.7	12.811	9	22 59 22.00	2.1858	1 15 57.6	14.698
10	21 14 40.69	2.2880	12 17 9.8	12.885	10	23 1 33.12	2.1849	1 1 15.6	14.701
11	21 16 57.87	2.2848	12 4 14.5	12.958	11	23 3 44.19	2.1841	0 46 33.5	14.702
12	21 19 14.86	2.2815	11 51 14.9	13.029	12	23 5 55.21	2.1833	0 31 51.4	14.701
13	21 21 31.65	2.2783	11 38 11.0	13.099	13	23 8 6.19	2.1827	0 17 9.4	14.698
14	21 23 48.25	2.2752	11 25 3.0	13.168	14	23 10 17.13	2.1820	S. 0 2 27.6	14.695
15	21 26 4.67	2.2721	11 11 50.9	13.235	15	23 12 28.03	2.1814	N. 0 12 14.0	14.691
16	21 28 20.90	2.2689	10 58 34.8	13.301	16	23 14 38.90	2.1809	0 26 55.3	14.684
17	21 30 36.94	2.2659	10 45 14.8	13.364	17	23 16 49.74	2.1804	0 41 36.1	14.676
18	21 32 52.81	2.2630	10 31 51.1	13.427	18	23 19 0.55	2.1800	0 56 16.4	14.666
19	21 35 8.50	2.2600	10 18 23.6	13.488	19	23 21 11.34	2.1797	1 10 56.0	14.655
20	21 37 24.01	2.2571	10 4 52.5	13.548	20	23 23 22.11	2.1793	1 25 35.0	14.643
21	21 39 39.35	2.2543	9 51 17.9	13.606	21	23 25 32.86	2.1791	1 40 13.2	14.629
22	21 41 54.53	2.2515	9 37 39.8	13.663	22	23 27 43.60	2.1789	1 54 50.5	14.613
23	21 44 9.53	2.2487	9 23 58.4	13.718	23	23 29 54.33	2.1788	2 9 26.8	14.597
24	21 46 24.37	2.2460	S. 9 10 13.7	13.772	24	23 32 5.05	2.1787	N. 2 24 2.1	14.579
THURSDAY 6.					SATURDAY 8.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	21 48 39.05	2.2433	S. 8 56 25.8	13.823	1	23 34 15.77	2.1787	N. 2 38 36.3	14.559
2	21 50 53.57	2.2408	8 42 34.9	13.874	2	23 36 26.49	2.1786	2 53 9.2	14.538
3	21 53 7.94	2.2382	8 28 40.9	13.923	3	23 38 37.20	2.1787	3 7 40.8	14.515
4	21 55 22.15	2.2356	8 14 44.1	13.971	4	23 40 47.93	2.1788	3 22 11.0	14.491
5	21 57 36.21	2.2332	8 0 44.4	14.018	5	23 42 58.66	2.1789	3 36 39.7	14.465
6	21 59 50.13	2.2308	7 46 42.0	14.062	6	23 45 9.40	2.1792	3 51 6.8	14.438
7	22 2 3.90	2.2283	7 32 37.0	14.105	7	23 47 20.16	2.1795	4 5 32.3	14.410
8	22 4 17.53	2.2260	7 18 29.4	14.147	8	23 49 30.94	2.1798	4 19 56.0	14.380
9	22 6 31.02	2.2238	7 4 19.4	14.187	9	23 51 41.73	2.1801	4 34 17.9	14.348
10	22 8 44.38	2.2216	6 50 7.0	14.225	10	23 53 52.55	2.1806	4 48 37.8	14.315
11	22 10 57.61	2.2193	6 35 52.4	14.263	11	23 56 3.40	2.1811	5 2 55.7	14.281
12	22 13 10.70	2.2172	6 21 35.5	14.298	12	23 58 14.28	2.1816	5 17 11.5	14.245
13	22 15 23.67	2.2152	6 7 16.6	14.332	13	0 0 25.19	2.1822	5 31 25.1	14.208
14	22 17 36.52	2.2132	5 52 55.7	14.365	14	0 2 36.14	2.1828	5 45 36.5	14.170
15	22 19 49.25	2.2113	5 38 32.8	14.397	15	0 4 47.12	2.1834	5 59 45.5	14.129
16	22 22 1.87	2.2093	5 24 8.1	14.426	16	0 6 58.15	2.1842	6 13 52.0	14.088
17	22 24 14.37	2.2075	5 9 41.7	14.453	17	0 9 9.22	2.1848	6 27 56.0	14.045
18	22 26 26.77	2.2058	4 55 13.7	14.480	18	0 11 20.33	2.1857	6 41 57.4	14.001
19	22 28 39.06	2.2040	4 40 44.1	14.506	19	0 13 31.50	2.1865	6 55 56.1	13.956
20	22 30 51.25	2.2023	4 26 13.0	14.529	20	0 15 42.71	2.1873	7 9 52.1	13.909
21	22 33 3.34	2.2008	4 11 40.6	14.551	21	0 17 53.98	2.1883	7 23 45.2	13.860
22	22 35 15.34	2.1992	3 57 6.9	14.572	22	0 20 5.31	2.1893	7 37 35.3	13.811
23	22 37 27.24	2.1977	3 42 32.0	14.591	23	0 22 16.70	2.1903	7 51 22.5	13.760
24	22 39 39.06	2.1963	3 27 56.0	14.608	24	0 24 28.15	2.1913	8 5 6.5	13.707
	22 41 50.79	2.1948	S. 3 13 19.0	14.624		0 26 39.66	2.1924	N. 8 18 47.3	13.653



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 9.					TUESDAY 11.				
0	h m s		N. 8 18 47.3	13.653	0	h m s		N. 17 48 19.8	9.639
1	0 26 39.66	2.1924	8 32 24.9	13.598	1	2 13 39.24	2.2706	17 57 54.9	9.530
2	0 28 51.24	2.1936	8 45 59.1	13.542	2	2 15 55.53	2.2723	18 7 23.4	9.420
3	0 31 2.89	2.1948	8 59 29.9	13.483	3	2 18 11.92	2.2740	18 16 45.3	9.310
4	0 33 14.61	2.1959	9 12 57.1	13.424	4	2 20 28.41	2.2756	18 26 0.6	9.198
5	0 35 26.40	2.1971	9 26 20.8	13.364	5	2 22 44.99	2.2773	18 35 9.1	9.085
6	0 37 38.26	2.1984	9 39 40.8	13.303	6	2 25 1.68	2.2789	18 44 10.8	8.972
7	0 39 50.21	2.1998	9 52 57.1	13.240	7	2 27 18.46	2.2804	18 53 5.7	8.858
8	0 42 2.23	2.2010	10 6 9.6	13.176	8	2 29 35.33	2.2820	19 1 53.8	8.743
9	0 44 14.33	2.2024	10 19 18.2	13.110	9	2 31 52.30	2.2836	19 10 34.9	8.628
10	0 46 26.52	2.2038	10 32 22.8	13.043	10	2 34 9.36	2.2850	19 19 9.1	8.512
11	0 48 38.79	2.2053	10 45 23.3	12.974	11	2 36 26.50	2.2865	19 27 36.3	8.394
12	0 50 51.15	2.2067	10 58 19.7	12.905	12	2 38 43.74	2.2879	19 35 56.4	8.277
13	0 53 3.59	2.2081	11 11 11.9	12.834	13	2 41 1.05	2.2893	19 44 9.5	8.158
14	0 55 16.12	2.2097	11 23 59.8	12.763	14	2 43 18.45	2.2908	19 52 15.4	8.039
15	0 57 28.75	2.2113	11 36 43.4	12.689	15	2 45 35.94	2.2921	20 0 14.2	7.920
16	0 59 41.47	2.2128	11 49 22.5	12.614	16	2 47 53.50	2.2933	20 8 5.8	7.800
17	1 1 54.28	2.2143	12 1 57.1	12.538	17	2 50 11.14	2.2947	20 15 50.2	7.679
18	1 4 7.19	2.2160	12 14 27.1	12.462	18	2 52 28.86	2.2958	20 23 27.3	7.558
19	1 6 20.20	2.2176	12 26 52.5	12.384	19	2 54 46.64	2.2970	20 30 57.1	7.435
20	1 8 33.30	2.2192	12 39 13.2	12.305	20	2 57 4.50	2.2982	20 38 19.5	7.313
21	1 10 46.50	2.2208	12 51 29.1	12.224	21	2 59 22.43	2.2993	20 45 34.6	7.190
22	1 12 59.80	2.2226	13 3 40.1	12.142	22	3 1 40.42	2.3004	20 52 42.3	7.067
23	1 15 13.21	2.2243	N. 13 15 46.1	12.059	23	3 3 58.48	2.3014	N. 20 59 42.6	6.943
24	1 17 26.72	2.2260				3 6 16.59	2.3023		
MONDAY 10.					WEDNESDAY 12.				
0	h m s		N. 13 27 47.2	11.976	0	h m s		N. 21 6 35.4	6.818
1	1 19 40.33	2.2278	13 39 43.2	11.890	1	3 8 34.76	2.3033	21 13 20.7	6.693
2	1 21 54.05	2.2295	13 51 34.0	11.803	2	3 10 52.99	2.3043	21 19 58.5	6.567
3	1 24 7.87	2.2313	14 3 19.6	11.716	3	3 13 11.27	2.3051	21 26 28.7	6.441
4	1 26 21.80	2.2331	14 14 59.9	11.628	4	3 15 29.60	2.3059	21 32 51.4	6.315
5	1 28 35.84	2.2348	14 26 34.9	11.538	5	3 17 47.98	2.3067	21 39 6.5	6.188
6	1 30 49.98	2.2366	14 38 4.5	11.448	6	3 20 6.40	2.3073	21 45 14.0	6.060
7	1 33 4.23	2.2384	14 49 28.6	11.355	7	3 22 24.86	2.3079	21 51 13.8	5.933
8	1 35 18.59	2.2403	15 0 47.1	11.262	8	3 24 43.35	2.3085	21 57 6.0	5.806
9	1 37 33.06	2.2420	15 12 0.0	11.168	9	3 27 1.88	2.3091	22 2 50.5	5.678
10	1 39 47.63	2.2438	15 23 7.3	11.073	10	3 29 20.44	2.3096	22 8 27.3	5.549
11	1 42 2.32	2.2457	15 34 8.8	10.978	11	3 31 39.03	2.3101	22 13 56.4	5.421
12	1 44 17.11	2.2474	15 45 4.6	10.881	12	3 33 57.65	2.3104	22 19 17.8	5.292
13	1 46 32.01	2.2493	15 55 54.5	10.782	13	3 36 16.28	2.3107	22 24 31.4	5.162
14	1 48 47.02	2.2511	16 6 38.4	10.683	14	3 38 34.93	2.3109	22 29 37.2	5.033
15	1 51 2.14	2.2529	16 17 16.4	10.583	15	3 40 53.59	2.3111	22 34 35.3	4.903
16	1 53 17.37	2.2548	16 27 48.3	10.482	16	3 43 12.26	2.3113	22 39 25.6	4.773
17	1 55 32.71	2.2566	16 38 14.2	10.380	17	3 45 30.94	2.3114	22 44 8.0	4.643
18	1 57 48.16	2.2583	16 48 33.9	10.277	18	3 47 49.63	2.3114	22 48 42.7	4.513
19	2 0 3.71	2.2601	16 58 47.4	10.173	19	3 50 8.31	2.3113	22 53 9.5	4.382
20	2 2 19.37	2.2618	17 8 54.6	10.068	20	3 52 26.98	2.3112	22 57 28.5	4.252
21	2 4 35.14	2.2636	17 18 55.5	9.963	21	3 54 45.65	2.3111	23 1 39.7	4.121
22	2 6 51.00	2.2654	17 28 50.1	9.856	22	3 57 4.31	2.3108	23 5 43.0	3.990
23	2 9 6.98	2.2672	17 38 38.2	9.748	23	3 59 22.95	2.3106	23 9 38.5	3.859
24	2 11 23.06	2.2688	N. 17 48 19.8	9.639	24	4 1 41.58	2.3103	N. 23 13 26.1	3.728
	2 13 39.24	2.2706				4 4 0.18	2.3098		

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 13.					SATURDAY 15.				
0	4 4 0.18	a. 3098	N. 23 13 26.1	3.728	0	5 53 12.36	a. 2180	N. 23 43 52.4	a. 343
1	4 6 18.75	a. 3093	23 17 5.8	3.597	1	5 55 25.34	a. 2148	23 41 28.3	a. 459
2	4 8 37.30	a. 3088	23 20 37.7	3.466	2	5 57 38.13	a. 2116	23 38 57.3	a. 575
3	4 10 55.81	a. 3082	23 24 1.7	3.334	3	5 59 50.73	a. 2083	23 36 19.3	a. 691
4	4 13 14.28	a. 3075	23 27 17.8	3.203	4	6 2 3.12	a. 2049	23 33 34.4	a. 805
5	4 15 32.71	a. 3067	23 30 26.1	3.073	5	6 4 15.32	a. 2016	23 30 42.7	a. 919
6	4 17 51.09	a. 3059	23 33 26.5	2.942	6	6 6 27.31	a. 1982	23 27 44.1	3.033
7	4 20 9.42	a. 3052	23 36 19.1	2.811	7	6 8 39.10	a. 1948	23 24 38.7	3.147
8	4 22 27.71	a. 3043	23 39 3.8	2.679	8	6 10 50.69	a. 1914	23 21 26.5	3.259
9	4 24 45.93	a. 3038	23 41 40.6	2.548	9	6 13 2.07	a. 1879	23 18 7.6	3.371
10	4 27 4.09	a. 3032	23 44 9.5	2.417	10	6 15 13.24	a. 1844	23 14 42.0	3.482
11	4 29 22.19	a. 3011	23 46 30.6	2.287	11	6 17 24.20	a. 1808	23 11 9.8	3.592
12	4 31 40.22	a. 2998	23 48 43.9	2.156	12	6 19 34.94	a. 1773	23 7 31.0	3.702
13	4 33 58.17	a. 2986	23 50 49.3	2.025	13	6 21 45.47	a. 1738	23 3 45.6	3.811
14	4 36 16.05	a. 2973	23 52 46.9	1.895	14	6 23 55.79	a. 1702	22 59 53.7	3.920
15	4 38 33.85	a. 2959	23 54 36.7	1.765	15	6 26 5.89	a. 1665	22 55 55.2	4.028
16	4 40 51.56	a. 2944	23 56 18.7	1.635	16	6 28 15.77	a. 1628	22 51 50.3	4.135
17	4 43 9.18	a. 2929	23 57 52.9	1.505	17	6 30 25.43	a. 1593	22 47 39.0	4.242
18	4 45 26.71	a. 2914	23 59 19.3	1.376	18	6 32 34.88	a. 1556	22 43 21.3	4.348
19	4 47 44.15	a. 2898	24 0 38.0	1.247	19	6 34 44.10	a. 1518	22 38 57.3	4.453
20	4 50 1.49	a. 2881	24 1 48.9	1.118	20	6 36 53.09	a. 1481	22 34 27.0	4.558
21	4 52 18.72	a. 2863	24 2 52.1	0.989	21	6 39 1.87	a. 1444	22 29 50.4	4.662
22	4 54 35.85	a. 2846	24 3 47.6	0.861	22	6 41 10.42	a. 1406	22 25 7.6	4.765
23	4 56 52.87	a. 2827	N. 24 4 35.4	0.733	23	6 43 18.74	a. 1368	N. 22 20 18.6	4.868
FRIDAY 14.					SUNDAY 16.				
0	4 59 9.77	a. 2808	N. 24 5 15.5	0.604	0	6 45 26.83	a. 1330	N. 22 15 23.4	4.970
1	5 1 26.56	a. 2788	24 5 47.9	0.477	1	6 47 34.70	a. 1293	22 10 22.2	5.071
2	5 3 43.22	a. 2767	24 6 12.7	0.350	2	6 49 42.34	a. 1255	22 5 14.9	5.172
3	5 5 59.76	a. 2746	24 6 29.9	0.223	3	6 51 49.76	a. 1217	22 0 1.6	5.271
4	5 8 16.17	a. 2724	24 6 39.4	+ 0.096	4	6 53 56.94	a. 1178	21 54 42.4	5.370
5	5 10 32.45	a. 2702	24 6 41.4	- 0.030	5	6 56 3.90	a. 1141	21 49 17.2	5.469
6	5 12 48.59	a. 2679	24 6 35.8	0.156	6	6 58 10.63	a. 1103	21 43 46.1	5.567
7	5 15 4.60	a. 2656	24 6 22.7	0.281	7	7 0 17.13	a. 1065	21 38 9.2	5.663
8	5 17 20.46	a. 2631	24 6 2.1	0.406	8	7 2 23.39	a. 1025	21 32 26.5	5.760
9	5 19 36.17	a. 2607	24 5 34.0	0.531	9	7 4 29.43	a. 0988	21 26 38.0	5.856
10	5 21 51.74	a. 2582	24 4 58.4	0.655	10	7 6 35.24	a. 0949	21 20 43.8	5.951
11	5 24 7.16	a. 2556	24 4 15.4	0.778	11	7 8 40.82	a. 0911	21 14 43.9	6.045
12	5 26 22.41	a. 2529	24 3 25.0	0.902	12	7 10 46.17	a. 0873	21 8 38.4	6.138
13	5 28 37.51	a. 2503	24 2 27.2	1.025	13	7 12 51.29	a. 0834	21 2 27.3	6.232
14	5 30 52.45	a. 2477	24 1 22.0	1.148	14	7 14 56.18	a. 0796	20 56 10.6	6.323
15	5 33 7.23	a. 2449	24 0 9.5	1.269	15	7 17 0.84	a. 0758	20 49 48.5	6.415
16	5 35 21.84	a. 2421	23 58 49.7	1.390	16	7 19 5.28	a. 0720	20 43 20.8	6.507
17	5 37 36.28	a. 2392	23 57 22.7	1.511	17	7 21 9.48	a. 0682	20 36 47.7	6.596
18	5 39 50.54	a. 2363	23 55 48.4	1.632	18	7 23 13.46	a. 0644	20 30 9.3	6.685
19	5 42 4.63	a. 2333	23 54 6.9	1.752	19	7 25 17.21	a. 0607	20 23 25.5	6.774
20	5 44 18.54	a. 2303	23 52 18.2	1.871	20	7 27 20.74	a. 0569	20 16 36.4	6.863
21	5 46 32.27	a. 2273	23 50 22.4	1.989	21	7 29 24.04	a. 0531	20 9 42.0	6.950
22	5 48 45.82	a. 2243	23 48 19.5	a. 208	22	7 31 27.11	a. 0493	20 2 42.4	7.036
23	5 50 59.18	a. 2212	23 46 9.5	a. 226	23	7 33 29.96	a. 0456	19 55 37.7	7.122
24	5 53 12.36	a. 2180	N. 23 43 52.4	a. 343	24	7 35 32.58	a. 0419	N. 19 48 27.8	7.207

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 17.					WEDNESDAY 19.				
0	7 35 32.58	2.0419	N. 19 48 27.8	7.207	0	9 9 46.08	1.8975	N. 12 37 18.7	10.503
1	7 37 34.99	2.0383	19 41 12.9	7.291	1	9 11 39.87	1.8955	12 26 46.9	10.557
2	7 39 37.17	2.0345	19 33 52.9	7.375	2	9 13 33.54	1.8936	12 16 11.9	10.608
3	7 41 39.13	2.0308	19 26 27.9	7.458	3	9 15 27.10	1.8917	12 5 33.9	10.660
4	7 43 40.87	2.0273	19 18 57.9	7.541	4	9 17 20.54	1.8898	11 54 52.7	10.712
5	7 45 42.40	2.0237	19 11 23.0	7.623	5	9 19 13.87	1.8879	11 44 8.5	10.762
6	7 47 43.71	2.0200	19 3 43.2	7.703	6	9 21 7.09	1.8861	11 33 21.3	10.811
7	7 49 44.80	2.0164	18 55 58.6	7.783	7	9 23 0.20	1.8844	11 22 31.2	10.860
8	7 51 45.68	2.0128	18 48 9.2	7.863	8	9 24 53.22	1.8828	11 11 38.1	10.909
9	7 53 46.34	2.0093	18 40 15.0	7.943	9	9 26 46.13	1.8811	11 0 42.1	10.958
10	7 55 46.80	2.0058	18 32 16.1	8.021	10	9 28 38.95	1.8795	10 49 43.2	11.004
11	7 57 47.04	2.0023	18 24 12.5	8.098	11	9 30 31.67	1.8780	10 38 41.6	11.051
12	7 59 47.07	1.9988	18 16 4.3	8.175	12	9 32 24.31	1.8766	10 27 37.1	11.098
13	8 1 46.90	1.9954	18 7 51.5	8.252	13	9 34 16.86	1.8752	10 16 29.9	11.143
14	8 3 46.52	1.9920	17 59 34.1	8.328	14	9 36 9.33	1.8738	10 5 20.0	11.187
15	8 5 45.94	1.9887	17 51 12.2	8.402	15	9 38 1.72	1.8725	9 54 7.5	11.231
16	8 7 45.16	1.9853	17 42 45.9	8.476	16	9 39 54.03	1.8713	9 42 52.3	11.275
17	8 9 44.18	1.9820	17 34 15.1	8.550	17	9 41 46.27	1.8701	9 31 34.5	11.318
18	8 11 43.00	1.9788	17 25 39.9	8.623	18	9 43 38.44	1.8689	9 20 14.1	11.360
19	8 13 41.63	1.9755	17 17 0.4	8.695	19	9 45 30.54	1.8678	9 8 51.3	11.402
20	8 15 40.06	1.9722	17 8 16.5	8.767	20	9 47 22.58	1.8668	8 57 25.9	11.443
21	8 17 38.29	1.9690	16 59 28.4	8.838	21	9 49 14.56	1.8658	8 45 58.1	11.483
22	8 19 36.34	1.9659	16 50 36.0	8.908	22	9 51 6.48	1.8648	8 34 27.9	11.523
23	8 21 34.20	1.9628	N. 16 41 39.5	8.977	23	9 52 58.34	1.8639	N. 8 22 55.4	11.562
TUESDAY 18.					THURSDAY 20.				
0	8 23 31.87	1.9596	N. 16 32 38.8	9.046	0	9 54 50.15	1.8632	N. 8 11 20.5	11.601
1	8 25 29.35	1.9565	16 23 34.0	9.114	1	9 56 41.92	1.8624	7 59 43.3	11.638
2	8 27 26.65	1.9535	16 14 25.1	9.182	2	9 58 33.64	1.8617	7 48 3.9	11.675
3	8 29 23.77	1.9506	16 5 12.2	9.248	3	10 0 25.32	1.8611	7 36 22.3	11.712
4	8 31 20.72	1.9477	15 55 55.3	9.314	4	10 2 16.97	1.8605	7 24 38.5	11.748
5	8 33 17.49	1.9448	15 46 34.5	9.380	5	10 4 8.58	1.8599	7 12 52.5	11.784
6	8 35 14.09	1.9418	15 37 9.7	9.446	6	10 6 0.16	1.8593	7 1 4.4	11.818
7	8 37 10.51	1.9390	15 27 41.0	9.510	7	10 7 51.72	1.8591	6 49 14.3	11.853
8	8 39 6.77	1.9363	15 18 8.5	9.573	8	10 9 43.25	1.8588	6 37 22.1	11.887
9	8 41 2.87	1.9336	15 8 32.2	9.636	9	10 11 34.77	1.8585	6 25 27.9	11.919
10	8 42 58.80	1.9308	14 58 52.2	9.698	10	10 13 26.27	1.8582	6 13 31.8	11.951
11	8 44 54.56	1.9281	14 49 8.5	9.759	11	10 15 17.75	1.8580	6 1 33.8	11.983
12	8 46 50.17	1.9256	14 39 21.1	9.821	12	10 17 9.23	1.8579	5 49 33.9	12.013
13	8 48 45.63	1.9230	14 29 30.0	9.882	13	10 19 0.70	1.8578	5 37 32.2	12.043
14	8 50 40.93	1.9204	14 19 35.3	9.941	14	10 20 52.17	1.8578	5 25 28.7	12.073
15	8 52 36.08	1.9179	14 9 37.1	10.000	15	10 22 43.64	1.8579	5 13 23.4	12.103
16	8 54 31.08	1.9154	13 59 35.3	10.059	16	10 24 35.12	1.8580	5 1 16.4	12.130
17	8 56 25.93	1.9131	13 49 30.0	10.117	17	10 26 26.60	1.8582	4 49 7.8	12.158
18	8 58 20.65	1.9108	13 39 21.3	10.173	18	10 28 18.10	1.8585	4 36 57.5	12.185
19	9 0 15.22	1.9084	13 29 9.2	10.230	19	10 30 9.62	1.8588	4 24 45.6	12.212
20	9 2 9.66	1.9062	13 18 53.7	10.287	20	10 32 1.15	1.8591	4 12 32.1	12.237
21	9 4 3.96	1.9039	13 8 34.8	10.344	21	10 33 52.71	1.8595	4 0 17.2	12.261
22	9 5 58.13	1.9018	12 58 12.7	10.396	22	10 35 44.29	1.8599	3 48 0.8	12.286
23	9 7 52.17	1.8996	12 47 47.3	10.450	23	10 37 35.90	1.8603	3 35 42.9	12.310
24	9 9 46.08	1.8975	N. 12 37 18.7	10.503	24	10 39 27.55	1.8612	N. 3 23 23.6	12.333

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 21.					SUNDAY 23.				
0	10 39 27.55	1.8612	N. 3 23 23.6	12.333	0	12 10 39.50	1.9628	S. 6 40 39.3	12.520
1	10 41 19.24	1.8618	3 11 3.0	12.354	1	12 12 37.38	1.9664	6 53 10.0	12.503
2	10 43 10.97	1.8625	2 58 41.1	12.375	2	12 14 35.47	1.9701	7 5 39.6	12.483
3	10 45 2.74	1.8633	2 46 18.0	12.396	3	12 16 33.79	1.9739	7 18 8.0	12.463
4	10 46 54.56	1.8641	2 33 53.6	12.417	4	12 18 32.34	1.9777	7 30 35.2	12.443
5	10 48 46.43	1.8650	2 21 28.0	12.437	5	12 20 31.11	1.9815	7 43 1.1	12.421
6	10 50 38.36	1.8660	2 9 1.2	12.455	6	12 22 30.12	1.9855	7 55 25.7	12.399
7	10 52 30.35	1.8670	1 56 33.4	12.473	7	12 24 29.37	1.9895	8 7 49.0	12.375
8	10 54 22.40	1.8681	1 44 4.5	12.490	8	12 26 28.86	1.9935	8 20 10.7	12.349
9	10 56 14.52	1.8693	1 31 34.6	12.506	9	12 28 28.59	1.9976	8 32 30.9	12.323
10	10 58 6.71	1.8704	1 19 3.8	12.522	10	12 30 28.57	2.0018	8 44 49.5	12.297
11	10 59 58.97	1.8717	1 6 32.0	12.538	11	12 32 28.80	2.0059	8 57 6.5	12.269
12	11 1 51.31	1.8731	0 53 59.3	12.552	12	12 34 29.28	2.0102	9 9 21.8	12.240
13	11 3 43.74	1.8745	0 41 25.8	12.565	13	12 36 30.02	2.0146	9 21 35.3	12.209
14	11 5 36.25	1.8759	0 28 51.5	12.578	14	12 38 31.03	2.0190	9 33 46.9	12.177
15	11 7 28.85	1.8774	0 16 16.5	12.589	15	12 40 32.30	2.0233	9 45 56.5	12.144
16	11 9 21.54	1.8790	N. 0 3 40.8	12.601	16	12 42 33.83	2.0278	9 58 4.2	12.112
17	11 11 14.33	1.8807	S. 0 8 55.6	12.612	17	12 44 35.64	2.0324	10 10 9.9	12.077
18	11 13 7.22	1.8824	0 21 32.6	12.621	18	12 46 37.72	2.0370	10 22 13.4	12.040
19	11 15 0.22	1.8842	0 34 10.1	12.630	19	12 48 40.08	2.0417	10 34 14.7	12.003
20	11 16 53.32	1.8860	0 46 48.2	12.638	20	12 50 42.72	2.0465	10 46 13.7	11.964
21	11 18 46.54	1.8879	0 59 26.7	12.646	21	12 52 45.64	2.0511	10 58 10.4	11.925
22	11 20 39.87	1.8898	1 12 5.7	12.653	22	12 54 48.85	2.0558	11 10 4.7	11.884
23	11 22 33.32	1.8919	S. 1 24 45.0	12.658	23	12 56 52.34	2.0607	S. 11 21 56.5	11.843
SATURDAY 22.					MONDAY 24.				
0	11 24 26.90	1.8940	S. 1 37 24.6	12.663	0	12 58 56.13	2.0656	S. 11 33 45.8	11.800
1	11 26 20.60	1.8962	1 50 4.5	12.668	1	13 1 0.21	2.0706	11 45 32.5	11.755
2	11 28 14.44	1.8984	2 2 44.7	12.671	2	13 3 4.60	2.0756	11 57 16.4	11.709
3	11 30 8.41	1.9006	2 15 25.0	12.673	3	13 5 9.28	2.0806	12 8 57.6	11.663
4	11 32 2.51	1.9029	2 28 5.5	12.675	4	13 7 14.27	2.0857	12 20 35.9	11.615
5	11 33 56.76	1.9054	2 40 46.0	12.675	5	13 9 19.56	2.0908	12 32 11.4	11.566
6	11 35 51.16	1.9078	2 53 26.5	12.675	6	13 11 25.16	2.0959	12 43 43.8	11.515
7	11 37 45.70	1.9103	3 6 7.0	12.675	7	13 13 31.07	2.1012	12 55 13.2	11.463
8	11 39 40.40	1.9130	3 18 47.5	12.673	8	13 15 37.30	2.1065	13 6 39.4	11.410
9	11 41 35.26	1.9157	3 31 27.8	12.670	9	13 17 43.85	2.1118	13 18 2.4	11.356
10	11 43 30.28	1.9183	3 44 7.9	12.666	10	13 19 50.71	2.1170	13 29 22.1	11.301
11	11 45 25.46	1.9211	3 56 47.7	12.662	11	13 21 57.89	2.1223	13 40 38.5	11.244
12	11 47 20.81	1.9240	4 9 27.3	12.657	12	13 24 5.39	2.1278	13 51 51.4	11.186
13	11 49 16.34	1.9269	4 22 6.5	12.651	13	13 26 13.22	2.1333	14 3 0.8	11.127
14	11 51 12.04	1.9299	4 34 45.4	12.644	14	13 28 21.38	2.1388	14 14 6.6	11.066
15	11 53 7.92	1.9328	4 47 23.8	12.635	15	13 30 29.87	2.1443	14 25 8.7	11.003
16	11 55 3.98	1.9359	5 0 1.6	12.626	16	13 32 38.70	2.1499	14 36 7.0	10.940
17	11 57 0.23	1.9391	5 12 38.9	12.617	17	13 34 47.86	2.1554	14 47 1.5	10.876
18	11 58 56.67	1.9423	5 25 15.6	12.606	18	13 36 57.35	2.1610	14 57 52.1	10.809
19	12 0 53.30	1.9455	5 37 51.6	12.594	19	13 39 7.18	2.1667	15 8 38.6	10.742
20	12 2 50.13	1.9488	5 50 26.9	12.581	20	13 41 17.36	2.1724	15 19 21.1	10.674
21	12 4 47.16	1.9523	6 3 1.3	12.567	21	13 43 27.87	2.1781	15 29 59.5	10.604
22	12 6 44.40	1.9558	6 15 34.9	12.553	22	13 45 38.73	2.1838	15 40 33.6	10.533
23	12 8 41.85	1.9592	6 28 7.6	12.537	23	13 47 49.93	2.1896	15 51 3.4	10.459
24	12 10 39.50	1.9628	S. 6 40 39.3	12.520	24	13 50 1.48	2.1954	S. 16 1 28.7	10.385

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 25.					THURSDAY 27.				
0	13 50 1.48	2.1954	S. 16 1 28.7	10.385	0	15 42 4.19	2.4638	S. 22 28 39.9	5.238
1	13 52 13.38	2.2012	16 11 49.6	10.311	1	15 44 32.16	2.4684	22 33 50.0	5.099
2	13 54 25.62	2.2070	16 22 6.0	10.234	2	15 47 0.40	2.4728	22 38 51.8	4.960
3	13 56 38.22	2.2128	16 32 17.7	10.155	3	15 49 28.90	2.4772	22 43 45.2	4.819
4	13 58 51.16	2.2187	16 42 24.6	10.075	4	15 51 57.66	2.4815	22 48 30.1	4.678
5	14 1 4.46	2.2246	16 52 26.7	9.995	5	15 54 26.68	2.4858	22 53 6.5	4.536
6	14 3 18.11	2.2304	17 2 24.0	9.913	6	15 56 55.95	2.4899	22 57 34.4	4.393
7	14 5 32.11	2.2363	17 12 16.2	9.828	7	15 59 25.47	2.4939	23 1 53.7	4.249
8	14 7 46.47	2.2423	17 22 3.4	9.744	8	16 1 55.22	2.4978	23 6 4.3	4.103
9	14 10 1.18	2.2482	17 31 45.5	9.658	9	16 4 25.21	2.5017	23 10 6.1	3.958
10	14 12 16.25	2.2541	17 41 22.3	9.569	10	16 6 55.43	2.5055	23 13 59.2	3.811
11	14 14 31.67	2.2600	17 50 53.8	9.480	11	16 9 25.87	2.5091	23 17 43.4	3.663
12	14 16 47.45	2.2659	18 0 19.9	9.390	12	16 11 56.52	2.5127	23 21 18.8	3.515
13	14 19 3.58	2.2718	18 9 40.6	9.298	13	16 14 27.39	2.5162	23 24 45.2	3.365
14	14 21 20.07	2.2778	18 18 55.7	9.204	14	16 16 58.46	2.5195	23 28 2.6	3.215
15	14 23 36.91	2.2837	18 28 5.1	9.109	15	16 19 29.73	2.5228	23 31 11.0	3.065
16	14 25 54.11	2.2897	18 37 8.8	9.013	16	16 22 1.19	2.5258	23 34 10.4	2.913
17	14 28 11.67	2.2956	18 46 6.7	8.916	17	16 24 32.83	2.5288	23 37 0.6	2.760
18	14 30 29.58	2.3014	18 54 58.7	8.817	18	16 27 4.65	2.5318	23 39 41.6	2.608
19	14 32 47.84	2.3073	19 3 44.7	8.717	19	16 29 36.65	2.5347	23 42 13.5	2.454
20	14 35 6.45	2.3132	19 12 24.7	8.616	20	16 32 8.82	2.5374	23 44 36.1	2.299
21	14 37 25.42	2.3191	19 20 58.6	8.513	21	16 34 41.14	2.5399	23 46 49.4	2.145
22	14 39 44.74	2.3249	19 29 26.2	8.408	22	16 37 13.61	2.5424	23 48 53.5	1.990
23	14 42 4.41	2.3308	S. 19 37 47.5	8.302	23	16 39 46.23	2.5448	S. 23 50 48.2	1.833
WEDNESDAY 26.					FRIDAY 28.				
0	14 44 24.43	2.3366	S. 19 46 2.4	8.195	0	16 42 18.98	2.5470	S. 23 52 33.5	1.677
1	14 46 44.80	2.3423	19 54 10.9	8.087	1	16 44 51.87	2.5492	23 54 9.4	1.530
2	14 49 5.51	2.3481	20 2 12.8	7.976	2	16 47 24.88	2.5511	23 55 35.9	1.383
3	14 51 26.57	2.3538	20 10 8.0	7.865	3	16 49 58.00	2.5530	23 56 53.0	1.206
4	14 53 47.97	2.3595	20 17 56.6	7.753	4	16 52 31.24	2.5548	23 58 0.6	1.047
5	14 56 9.71	2.3653	20 25 38.4	7.639	5	16 55 4.58	2.5564	23 58 58.6	0.888
6	14 58 31.80	2.3709	20 33 13.3	7.524	6	16 57 38.01	2.5579	23 59 47.2	0.730
7	15 0 54.22	2.3764	20 40 41.3	7.407	7	17 0 11.53	2.5593	24 0 26.2	0.570
8	15 3 16.97	2.3820	20 48 2.2	7.289	8	17 2 45.13	2.5606	24 0 55.6	0.410
9	15 5 40.06	2.3875	20 55 16.0	7.171	9	17 5 18.80	2.5618	24 1 15.4	0.251
10	15 8 3.47	2.3929	21 2 22.7	7.051	10	17 7 52.54	2.5628	24 1 25.7	- 0.091
11	15 10 27.21	2.3984	21 9 22.1	6.929	11	17 10 26.33	2.5636	24 1 26.3	+ 0.070
12	15 12 51.28	2.4038	21 16 14.2	6.807	12	17 13 0.17	2.5644	24 1 17.3	0.230
13	15 15 15.67	2.4092	21 22 58.9	6.682	13	17 15 34.06	2.5651	24 0 58.7	0.390
14	15 17 40.38	2.4144	21 29 36.0	6.556	14	17 18 7.98	2.5656	24 0 30.5	0.551
15	15 20 5.40	2.4197	21 36 5.6	6.430	15	17 20 41.93	2.5660	23 59 52.6	0.712
16	15 22 30.74	2.4248	21 42 27.6	6.302	16	17 23 15.90	2.5663	23 59 5.1	0.872
17	15 24 56.38	2.4299	21 48 41.8	6.173	17	17 25 49.89	2.5665	23 58 8.0	1.033
18	15 27 22.33	2.4350	21 54 48.3	6.043	18	17 28 23.88	2.5665	23 57 1.2	1.195
19	15 29 48.58	2.4399	22 0 46.9	5.911	19	17 30 57.87	2.5664	23 55 44.8	1.354
20	15 32 15.12	2.4448	22 6 37.6	5.778	20	17 33 31.85	2.5662	23 54 18.7	1.515
21	15 34 41.96	2.4497	22 12 20.3	5.645	21	17 36 5.81	2.5658	23 52 43.0	1.674
22	15 37 9.09	2.4545	22 17 55.0	5.510	22	17 38 39.75	2.5654	23 50 57.8	1.834
23	15 39 36.50	2.4592	22 23 21.5	5.374	23	17 41 13.66	2.5648	23 49 2.9	1.995
24	15 42 4.19	2.4638	S. 22 28 39.9	5.238	24	17 43 47.53	2.5642	S. 23 46 58.4	2.155

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 29.					MONDAY, MAY 1.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	17 43 47.53	2.5642	S. 23 46 58.4	2.155	1	19 44 8.71	2.4208	S. 19 10 21.9	9.040
2	17 46 21.36	2.5633	23 44 44.3	2.314					
3	17 48 55.13	2.5623	23 42 20.7	2.473					
4	17 51 28.84	2.5613	23 39 47.6	2.632					
5	17 54 2.49	2.5602	23 37 4.9	2.791					
6	17 56 36.06	2.5588	23 34 12.7	2.949					
7	17 59 9.55	2.5575	23 31 11.0	3.107					
8	18 1 42.96	2.5561	23 27 59.9	3.265					
9	18 4 16.28	2.5544	23 24 39.4	3.421					
10	18 6 49.49	2.5527	23 21 9.4	3.578					
11	18 9 22.60	2.5508	23 17 30.1	3.733					
12	18 11 55.59	2.5488	23 13 41.5	3.888					
13	18 14 28.46	2.5468	23 9 43.6	4.043					
14	18 17 1.21	2.5447	23 5 36.4	4.198					
15	18 19 33.82	2.5424	23 1 19.9	4.351					
16	18 22 6.30	2.5401	22 56 54.3	4.503					
17	18 24 38.63	2.5377	22 52 19.5	4.656					
18	18 27 10.82	2.5352	22 47 35.6	4.808					
19	18 29 42.85	2.5325	22 42 42.6	4.958					
20	18 32 14.72	2.5298	22 37 40.6	5.108					
21	18 34 46.42	2.5269	22 32 29.6	5.258					
22	18 37 17.95	2.5240	22 27 9.7	5.406					
23	18 39 49.30	2.5210	22 21 40.9	5.553					
24	18 42 20.47	2.5180	22 16 3.3	5.700					
SUNDAY 30.					PHASES OF THE MOON.				
0	18 44 51.46	2.5148	S. 22 10 16.9	5.847					
1	18 47 22.25	2.5116	22 4 21.7	5.992					
2	18 49 52.85	2.5083	21 58 17.9	6.136					
3	18 52 23.25	2.5050	21 52 5.4	6.279					
4	18 54 53.45	2.5015	21 45 44.4	6.421					
5	18 57 23.43	2.4979	21 39 14.9	6.563					
6	18 59 53.20	2.4944	21 32 36.9	6.703					
7	19 2 22.76	2.4908	21 25 50.6	6.842					
8	19 4 52.09	2.4870	21 18 55.9	6.981					
9	19 7 21.20	2.4833	21 11 52.9	7.118					
10	19 9 50.08	2.4793	21 4 41.7	7.254					
11	19 12 18.72	2.4754	20 57 22.4	7.388					
12	19 14 47.13	2.4715	20 49 55.1	7.523					
13	19 17 15.30	2.4675	20 42 19.7	7.656					
14	19 19 43.23	2.4635	20 34 36.4	7.788					
15	19 22 10.92	2.4594	20 26 45.2	7.918					
16	19 24 38.36	2.4553	20 18 46.2	8.048					
17	19 27 5.55	2.4511	20 10 39.5	8.176					
18	19 29 32.49	2.4468	20 2 25.1	8.303					
19	19 31 59.17	2.4426	19 54 3.2	8.428					
20	19 34 25.60	2.4383	19 45 33.7	8.554					
21	19 36 51.77	2.4340	19 36 56.7	8.678					
22	19 39 17.68	2.4297	19 28 12.4	8.800					
23	19 41 43.33	2.4253	19 19 20.7	8.921					
24	19 44 8.71	2.4208	S. 19 10 21.9	9.040					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	Spica W.	53 20 31	2422	55 3 35	2415	56 46 49	2408	58 30 13	2401
	JUPITER W.	37 41 45	2435	39 24 30	2424	41 7 30	2415	42 50 44	2405
	VENUS E.	74 13 42	2813	72 39 31	2807	71 5 12	2800	69 30 44	2793
	Fomalhaut E.	76 59 44	2887	75 27 9	2887	73 54 34	2890	72 22 2	2892
	α Pegasi E.	96 24 25	2556	94 44 29	2548	93 4 22	2540	91 24 5	2534
	SUN E.	115 43 30	2759	114 8 8	2750	112 32 35	2743	110 56 52	2735
2	Spica W.	67 9 42	2366	68 54 5	2360	70 38 37	2354	72 23 18	2347
	JUPITER W.	51 30 14	2361	53 14 45	2353	54 59 27	2346	56 44 20	2338
	VENUS E.	61 36 12	2761	60 0 53	2754	58 25 25	2749	56 49 50	2743
	Fomalhaut E.	64 40 43	2925	63 8 56	2937	61 37 24	2950	60 6 8	2965
	α Pegasi E.	83 0 25	2503	81 19 16	2498	79 38 0	2493	77 56 37	2489
	SUN E.	102 55 45	2698	101 19 2	2690	99 42 9	2684	98 5 7	2677
3	Spica W.	81 9 4	2316	82 54 40	2310	84 40 25	2304	86 26 18	2299
	JUPITER W.	65 31 25	2303	67 17 20	2296	69 3 25	2291	70 49 38	2284
	Antares W.	35 35 12	2322	37 20 39	2316	39 6 15	2309	40 52 1	2303
	VENUS E.	48 50 4	2717	47 13 47	2712	45 37 23	2708	44 0 54	2704
	α Pegasi E.	69 28 22	2473	67 46 31	2472	66 4 38	2470	64 22 43	2470
	SUN E.	89 57 39	2643	88 19 43	2637	86 41 38	2631	85 3 25	2625
4	JUPITER W.	79 42 57	2256	81 30 1	2251	83 17 12	2246	85 4 31	2242
	Antares W.	49 43 3	2274	51 29 40	2270	53 16 24	2264	55 3 16	2260
	SATURN W.	33 58 51	2277	35 45 24	2272	37 32 5	2266	39 18 54	2261
	α Pegasi E.	55 53 18	2480	54 11 36	2484	52 30 0	2490	50 48 33	2498
	SUN E.	76 50 21	2597	75 11 22	2592	73 32 16	2588	71 53 4	2583
5	Antares W.	63 59 12	2240	65 46 40	2237	67 34 13	2234	69 21 50	2231
	SATURN W.	48 14 46	2239	50 2 15	2236	51 49 49	2233	53 37 28	2230
	SUN E.	63 35 39	2564	61 55 55	2562	60 16 8	2559	58 36 17	2558
6	Antares W.	78 20 49	2223	80 8 43	2221	81 56 39	2221	83 44 35	2220
	SATURN W.	62 36 37	2220	64 24 34	2219	66 12 33	2218	68 0 33	2218
	SUN E.	50 16 32	2553	48 36 33	2553	46 56 34	2555	45 16 37	2556
7	Antares W.	92 44 7	2227	94 31 55	2229	96 19 40	2231	98 7 21	2235
	SATURN W.	77 0 24	2223	78 48 17	2225	80 36 7	2228	82 23 53	2231
	SUN E.	36 57 44	2575	35 18 15	2581	33 38 54	2588	31 59 43	2597
11	SUN W.	16 18 39	3005	17 48 45	2993	19 19 6	2987	20 49 35	2985
	Pollux E.	74 18 20	2546	72 38 11	2561	70 58 22	2576	69 18 54	2592
	MARS E.	81 11 48	2630	79 33 34	2646	77 55 41	2660	76 18 8	2675
12	SUN W.	28 21 29	3014	29 51 25	3023	31 21 9	3034	32 50 39	3047
	Pollux E.	61 7 0	2673	59 29 44	2689	57 52 50	2707	56 16 20	2725
	MARS E.	68 15 30	2753	66 40 1	2769	65 4 53	2786	63 30 7	2801
	Regulus E.	97 51 34	2626	96 13 14	2640	94 35 14	2655	92 57 34	2670
13	SUN W.	40 14 19	3112	41 42 14	3125	43 9 53	3139	44 37 15	3153
	Pollux E.	48 19 43	2816	46 45 36	2835	45 11 54	2855	43 38 38	2875
	MARS E.	55 41 27	2882	54 8 45	2898	52 36 24	2914	51 4 23	2931
	Regulus E.	84 54 13	2744	83 18 32	2759	81 43 10	2773	80 8 7	2788

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	Spica W.	60 13 47	2394	61 57 31	2387	63 41 25	2380	65 25 29	2373
	JUPITER W.	44 34 12	2396	46 17 53	2386	48 1 48	2378	49 45 55	2369
	VENUS E.	67 56 7	2786	66 21 21	2779	64 46 26	2773	63 11 23	2767
	Fomalhaut E.	70 49 33	2896	69 17 9	2901	67 44 51	2908	66 12 42	2916
	α Pegasi E.	89 43 39	2527	88 3 3	2521	86 22 19	2515	84 41 26	2509
	SUN E.	109 20 59	2728	107 44 56	2719	106 8 42	2712	104 32 18	2705
2	Spica W.	74 8 9	2341	75 53 9	2335	77 38 18	2328	79 23 37	2322
	JUPITER W.	58 29 24	2331	60 14 39	2324	62 0 4	2316	63 45 40	2310
	VENUS E.	55 14 7	2738	53 38 17	2732	52 2 19	2727	50 26 15	2722
	Fomalhaut E.	58 35 11	2982	57 4 36	3003	55 34 27	3026	54 4 46	3052
	α Pegasi E.	76 15 8	2485	74 33 33	2482	72 51 54	2478	71 10 10	2475
	SUN E.	96 27 56	2669	94 50 35	2663	93 13 5	2656	91 35 26	2650
3	Spica W.	88 12 19	2294	89 58 28	2288	91 44 45	2283	93 31 10	2278
	JUPITER W.	72 36 1	2278	74 22 33	2272	76 9 13	2267	77 56 1	2262
	Antares W.	42 37 56	2297	44 24 0	2291	46 10 13	2285	47 56 34	2280
	VENUS E.	42 24 20	2701	40 47 41	2698	39 10 59	2695	37 34 13	2694
	α Pegasi E.	62 40 47	2470	60 58 51	2471	59 16 57	2473	57 35 6	2475
	SUN E.	83 25 4	2619	81 46 35	2613	80 7 58	2607	78 29 13	2602
4	JUPITER W.	86 51 56	2237	88 39 28	2233	90 27 6	2230	92 14 49	2226
	Antares W.	56 50 15	2256	58 37 20	2251	60 24 32	2247	62 11 49	2243
	SATURN W.	41 5 51	2256	42 52 55	2251	44 40 6	2247	46 27 23	2243
	α Pegasi E.	49 7 17	2507	47 26 14	2518	45 45 26	2532	44 4 57	2548
	SUN E.	70 13 46	2579	68 34 22	2575	66 54 53	2571	65 15 18	2568
5	Antares W.	71 9 32	2229	72 57 17	2227	74 45 5	2225	76 32 56	2223
	SATURN W.	55 25 11	2227	57 12 58	2225	59 0 48	2223	60 48 41	2221
	SUN E.	56 56 24	2556	55 16 28	2554	53 36 30	2553	51 56 31	2553
6	Antares W.	85 32 32	2221	87 20 28	2222	89 8 23	2223	90 56 16	2225
	SATURN W.	69 48 33	2219	71 36 32	2219	73 24 31	2220	75 12 28	2221
	SUN E.	43 36 42	2559	41 56 50	2562	40 17 3	2565	38 37 20	2570
7	Antares W.	99 54 57	2238	101 42 28	2242	103 29 53	2247	105 17 11	2251
	SATURN W.	84 11 34	2235	85 59 10	2238	87 46 41	2243	89 34 5	2247
	SUN E.	30 20 44	2607	28 41 58	2618	27 3 28	2631	25 25 15	2646
11	SUN W.	22 20 7	2986	23 50 37	2989	25 21 3	2996	26 51 21	3004
	Pollux E.	67 39 48	2607	66 1 3	2624	64 22 40	2640	62 44 39	2656
	MARS E.	74 40 55	2691	73 4 3	2706	71 27 31	2722	69 51 20	2738
12	SUN W.	34 19 54	3059	35 48 54	3071	37 17 39	3085	38 46 7	3098
	Pollux E.	54 40 13	2743	53 4 30	2760	51 29 10	2779	49 54 14	2798
	MARS E.	61 55 41	2818	60 21 36	2834	58 47 52	2850	57 14 29	2866
	Regulus E.	91 20 14	2685	89 43 14	2700	88 6 34	2715	86 30 14	2729
13	SUN W.	46 4 21	3167	47 31 10	3180	48 57 43	3194	50 23 59	3208
	Pollux E.	42 5 47	2896	40 33 23	2916	39 1 25	2939	37 29 55	2962
	MARS E.	49 32 43	2946	48 1 23	2962	46 30 23	2978	44 59 43	2994
	Regulus E.	78 33 23	2802	76 58 58	2816	75 24 51	2830	73 51 2	2845



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
14	SUN	W.	51 49 59	3221	53 15 43	3234	54 41 12	3247	56 6 25	3260
	Pollux	E.	35 58 54	2985	34 28 23	3010	32 58 23	3037	31 28 56	3065
	MARS	E.	43 29 23	3010	41 59 23	3025	40 29 41	3041	39 0 19	3056
	Regulus	E.	72 17 32	2858	70 44 19	2871	69 11 23	2884	67 38 44	2897
15	SUN	W.	63 8 54	3319	64 32 43	3331	65 56 19	3341	67 19 43	3350
	Aldebaran	W.	20 50 47	3227	22 16 24	3203	23 42 30	3184	25 8 58	3170
	Regulus	E.	59 59 26	2957	58 28 19	2969	56 57 27	2979	55 26 48	2990
16	SUN	W.	74 13 58	3396	75 36 19	3405	76 58 32	3411	78 20 36	3417
	Aldebaran	W.	32 24 28	3137	33 51 53	3134	35 19 21	3133	36 46 50	3132
	Regulus	E.	47 56 44	3038	46 27 18	3046	44 58 2	3055	43 28 57	3063
	Spica	E.	101 54 9	3016	100 24 16	3022	98 54 31	3030	97 24 55	3035
17	SUN	W.	85 9 16	3443	86 30 44	3446	87 52 8	3450	89 13 28	3453
	Aldebaran	W.	44 4 29	3130	45 32 2	3130	46 59 35	3130	48 27 8	3129
	Regulus	E.	36 5 54	3100	34 37 44	3106	33 9 42	3114	31 41 49	3120
	Spica	E.	89 58 38	3060	88 29 39	3064	87 0 45	3066	85 31 54	3069
	JUPITER	E.	104 1 10	3031	102 31 36	3035	101 2 7	3038	99 32 41	3040
18	SUN	W.	95 59 36	3458	97 20 47	3457	98 41 59	3456	100 3 12	3455
	Aldebaran	W.	55 45 11	3123	57 12 53	3121	58 40 37	3118	60 8 25	3115
	Spica	E.	78 8 17	3075	76 39 37	3074	75 10 56	3073	73 42 14	3072
	JUPITER	E.	92 6 3	3045	90 36 46	3044	89 7 28	3043	87 38 9	3042
19	SUN	W.	106 49 52	3439	108 11 24	3436	109 33 0	3431	110 54 42	3426
	Aldebaran	W.	67 28 23	3096	68 56 38	3091	70 24 59	3086	71 53 26	3079
	Pollux	W.	26 16 39	3292	27 41 0	3265	29 5 53	3240	30 31 15	3218
	Spica	E.	66 18 7	3058	64 49 6	3055	63 20 1	3050	61 50 50	3046
	JUPITER	E.	80 10 57	3029	78 41 20	3025	77 11 38	3020	75 41 50	3016
20	Aldebaran	W.	79 17 40	3046	80 46 56	3037	82 16 23	3029	83 46 0	3021
	Pollux	W.	37 43 53	3131	39 11 25	3115	40 39 16	3101	42 7 25	3087
	MARS	W.	26 46 11	3231	28 11 44	3216	29 37 34	3203	31 3 40	3189
	Spica	E.	54 23 16	3014	52 53 21	3008	51 23 18	3000	49 53 5	2992
	JUPITER	E.	68 11 16	2986	66 40 46	2980	65 10 8	2972	63 39 20	2965
	Antares	E.	99 57 4	3012	98 27 6	3004	96 56 58	2996	95 26 40	2988
21	Aldebaran	W.	91 16 48	2974	92 47 33	2964	94 18 31	2954	95 49 42	2943
	Pollux	W.	49 32 27	3017	51 2 19	3004	52 32 27	2990	54 2 52	2977
	MARS	W.	38 18 3	3126	39 45 41	3114	41 13 34	3101	42 41 43	3088
	Spica	E.	42 19 24	2948	40 48 6	2939	39 16 36	2929	37 44 54	2920
	JUPITER	E.	56 2 54	2924	54 31 5	2915	52 59 5	2905	51 26 53	2897
	Antares	E.	87 52 28	2942	86 21 2	2931	84 49 23	2921	83 17 31	1910
	SATURN	E.	103 20 17	2930	101 48 36	2920	100 16 42	2909	98 44 34	2898
22	Pollux	W.	61 39 12	2909	63 11 19	2895	64 43 44	2882	66 16 26	2869
	MARS	W.	50 6 23	3023	51 36 7	3009	53 6 8	2996	54 36 26	2983
	Regulus	W.	24 37 48	2930	26 9 29	2910	27 41 35	2892	29 14 6	2873
	JUPITER	E.	43 42 59	2850	42 9 36	2842	40 36 2	2832	39 2 16	2825
	Antares	E.	75 34 39	2854	74 1 21	2842	72 27 47	2829	70 53 57	2818
	SATURN	E.	91 0 24	2842	89 26 49	2829	87 52 59	2817	86 18 53	2805

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
14	SUN	W.	57 31 23	3272	58 56 7	3285	60 20 36	3296	61 44 52	3308
	Pollux	E.	30 0 3	3095	28 31 47	3129	27 4 12	3164	25 37 20	3205
	MARS	E.	37 31 16	3072	36 2 32	3088	34 34 8	3104	33 6 3	3119
	Regulus	E.	66 6 21	2909	64 34 14	2922	63 2 23	2934	61 30 47	2946
15	SUN	W.	68 42 56	3361	70 5 57	3370	71 28 48	3379	72 51 28	3388
	Aldebaran	W.	26 35 43	3159	28 2 41	3150	29 29 50	3144	30 57 6	3139
	Regulus	E.	53 56 23	3000	52 26 10	3010	50 56 10	3019	49 26 21	3029
16	SUN	W.	79 42 33	3423	81 4 23	3430	82 26 6	3434	83 47 44	3439
	Aldebaran	W.	38 14 21	3132	39 41 52	3131	41 9 24	3131	42 36 56	3130
	Regulus	E.	42 0 2	3070	40 31 16	3078	39 2 40	3086	37 34 13	3092
	Spica	E.	95 55 26	3042	94 26 5	3047	92 56 50	3052	91 27 41	3056
17	SUN	W.	90 34 45	3454	91 56 0	3456	93 17 13	3457	94 38 25	3458
	Aldebaran	W.	49 54 42	3129	51 22 17	3128	52 49 53	3126	54 17 31	3124
	Regulus	E.	30 14 4	3128	28 46 28	3136	27 19 2	3143	25 51 45	3152
	Spica	E.	84 3 7	3071	82 34 22	3073	81 5 39	3074	79 36 58	3074
	JUPITER	E.	98 3 18	3042	96 33 57	3043	95 4 38	3044	93 35 20	3045
18	SUN	W.	101 24 26	3453	102 45 43	3451	104 7 2	3447	105 28 25	3444
	Aldebaran	W.	61 36 16	3112	63 4 11	3109	64 32 10	3105	66 0 14	3101
	Spica	E.	72 13 30	3070	70 44 44	3068	69 15 55	3065	67 47 3	3062
	JUPITER	E.	86 8 48	3040	84 39 25	3038	83 9 59	3035	81 40 30	3032
19	SUN	W.	112 16 29	3420	113 38 23	3414	115 0 24	3407	116 22 33	3400
	Aldebaran	W.	73 22 1	3073	74 50 43	3066	76 19 34	3060	77 48 33	3053
	Pollux	W.	31 57 3	3198	33 23 14	3180	34 49 47	3163	36 16 40	3147
	Spica	E.	60 21 34	3040	58 52 11	3034	57 22 40	3028	55 53 2	3022
	JUPITER	E.	74 11 57	3010	72 41 57	3005	71 11 51	2999	69 41 37	2993
20	Aldebaran	W.	85 15 47	3012	86 45 45	3003	88 15 54	2993	89 46 15	2984
	Pollux	W.	43 35 51	3073	45 4 34	3058	46 33 35	3045	48 2 52	3030
	MARS	W.	32 30 2	3177	33 56 39	3163	35 23 32	3151	36 50 40	3138
	Spica	E.	48 22 42	2984	46 52 9	2975	45 21 25	2966	43 50 30	2958
	JUPITER	E.	62 8 23	2957	60 37 16	2949	59 5 59	2941	57 34 32	2932
	Antares	E.	93 56 12	2979	92 25 33	2970	90 54 43	2961	89 23 41	2952
21	Aldebaran	W.	97 21 6	2932	98 52 44	2922	100 24 35	2910	101 56 41	2899
	Pollux	W.	55 33 34	2963	57 4 33	2950	58 35 49	2936	60 7 22	2923
	MARS	W.	44 10 7	3075	45 38 47	3062	47 7 43	3049	48 36 55	3036
	Spica	E.	36 13 0	2909	34 40 53	2899	33 8 33	2889	31 36 0	2879
	JUPITER	E.	49 54 30	2887	48 21 55	2878	46 49 8	2869	45 16 9	2860
	Antares	E.	81 45 25	2899	80 13 5	2888	78 40 31	2876	77 7 42	2866
	SATURN	E.	97 12 13	2887	95 39 38	2876	94 6 48	2864	92 33 43	2853
22	Pollux	W.	67 49 25	2855	69 22 42	2841	70 56 17	2828	72 30 9	2814
	MARS	W.	56 7 0	2969	57 37 51	2956	59 8 59	2943	60 40 23	2929
	Regulus	W.	30 47 0	2855	32 20 17	2838	33 53 56	2821	35 27 57	2805
	JUPITER	E.	37 28 20	2816	35 54 13	2808	34 19 56	2801	32 45 30	2795
	Antares	E.	69 19 52	2805	67 45 31	2793	66 10 54	2780	64 36 0	2768
	SATURN	E.	84 44 31	2792	83 9 53	2779	81 34 58	2767	79 59 47	2754

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
23	Pollux	W.	74 4 19	2800	75 38 47	2787	77 13 32	2773	78 48 35	2760
	MARS	W.	62 12 5	2916	63 44 4	2902	65 16 20	2889	66 48 53	2875
	Regulus	W.	37 2 19	2789	38 37 1	2773	40 12 4	2759	41 47 26	2744
	Antares	E.	63 0 50	2755	61 25 23	2743	59 49 40	2730	58 13 40	2717
	SATURN	E.	78 24 19	2741	76 48 34	2729	75 12 33	2716	73 36 14	2703
24	Pollux	W.	86 48 10	2695	88 24 57	2683	90 2 0	2669	91 39 21	2657
	MARS	W.	74 36 0	2808	76 10 17	2795	77 44 51	2782	79 19 42	2770
	Regulus	W.	49 49 8	2672	51 26 25	2658	53 4 1	2645	54 41 55	2632
	Antares	E.	50 9 28	2655	48 31 48	2643	46 53 51	2631	45 15 38	2618
	SATURN	E.	65 30 24	2640	63 52 23	2627	62 14 5	2615	60 35 30	2602
	α Aquilæ	E.	103 7 25	3165	101 40 34	3146	100 13 20	3128	98 45 44	3111
25	Pollux	W.	99 50 8	2599	101 29 5	2588	103 8 16	2577	104 47 42	2568
	MARS	W.	87 18 5	2708	88 54 34	2696	90 31 19	2685	92 8 19	2674
	Regulus	W.	62 55 49	2569	64 35 27	2556	66 15 22	2545	67 55 33	2533
	Antares	E.	37 0 34	2563	35 20 48	2552	33 40 47	2543	32 0 33	2533
	SATURN	E.	52 18 26	2543	50 38 13	2532	48 57 44	2521	47 17 0	2510
	α Aquilæ	E.	91 22 59	3040	89 53 36	3028	88 23 58	3018	86 54 7	3009
26	MARS	W.	100 17 0	2621	101 55 26	2612	103 34 5	2602	105 12 57	2593
	Regulus	W.	76 20 23	2480	78 2 5	2470	79 44 1	2460	81 26 11	2450
	Spica	W.	22 18 1	2495	23 59 21	2481	25 41 1	2468	27 22 59	2457
	SATURN	E.	38 49 38	2460	37 7 28	2451	35 25 6	2442	33 42 31	2433
	α Aquilæ	E.	79 22 20	2976	77 51 37	2972	76 20 49	2970	74 49 59	2969
	Fomalhaut	E.	105 5 32	2945	103 34 10	2928	102 2 27	2912	100 30 24	2898
27	Regulus	W.	90 0 9	2408	91 43 32	2401	93 27 5	2394	95 10 49	2387
	Spica	W.	35 56 39	2407	37 40 4	2398	39 23 41	2390	41 7 30	2382
	α Aquilæ	E.	67 16 12	2988	65 45 44	2997	64 15 28	3009	62 45 26	3021
	Fomalhaut	E.	92 46 4	2843	91 12 32	2835	89 38 49	2828	88 4 57	2821
28	Spica	W.	49 49 11	2349	51 33 59	2344	53 18 55	2338	55 3 59	2333
	JUPITER	W.	37 25 6	2357	39 9 43	2348	40 54 32	2340	42 39 33	2332
	α Aquilæ	E.	55 20 14	3125	53 52 35	3157	52 25 34	3191	50 59 14	3231
	Fomalhaut	E.	80 14 8	2808	78 39 50	2808	77 5 33	2810	75 31 18	2814
	α Pegasi	E.	99 46 8	2482	98 4 30	2476	96 22 43	2470	94 40 47	2465
	VENUS	E.	109 26 53	2761	107 51 34	2755	106 16 7	2749	104 40 32	2744
29	Spica	W.	63 50 58	2313	65 36 39	2310	67 22 24	2307	69 8 14	2304
	JUPITER	W.	51 27 14	2302	53 13 11	2297	54 59 15	2293	56 45 25	2289
	Fomalhaut	E.	67 41 39	2849	66 8 15	2861	64 35 6	2875	63 2 15	2891
	α Pegasi	E.	86 9 29	2445	84 26 59	2443	82 44 25	2440	81 1 48	2440
	VENUS	E.	96 40 59	2721	95 4 47	2718	93 28 31	2715	91 52 11	2712
30	Spica	W.	77 58 18	2294	79 44 27	2291	81 30 39	2291	83 16 52	2290
	JUPITER	W.	65 37 29	2275	67 24 5	2273	69 10 44	2272	70 57 25	2270
	Antares	W.	32 26 24	2304	34 12 18	2300	35 58 17	2298	37 44 19	2296
	Fomalhaut	E.	55 23 59	3005	53 53 53	3038	52 24 27	3073	50 55 45	3114
	α Pegasi	E.	72 28 34	2441	70 45 58	2443	69 3 25	2445	67 20 55	2449
	VENUS	E.	83 49 40	2702	82 13 3	2701	80 36 24	2700	78 59 44	2699
	SUN	E.	119 31 29	2611	117 52 49	2609	116 14 6	2607	114 35 21	2605

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
23	Pollux	W.	80 23 55	2747	81 59 33	2734	83 35 28	2721	85 11 40	2707
	MARS	W.	68 21 44	2862	69 54 52	2848	71 28 17	2835	73 2 0	2821
	Regulus	W.	43 23 8	2729	44 59 9	2714	46 35 30	2700	48 12 10	2687
	Antares	E.	56 37 23	2704	55 0 49	2692	53 23 59	2680	51 46 52	2667
	SATURN	E.	71 59 38	2690	70 22 45	2678	68 45 35	2665	67 8 8	2652
24	Pollux	W.	93 16 58	2646	94 54 51	2633	96 33 1	2621	98 11 27	2610
	MARS	W.	80 54 49	2757	82 30 13	2744	84 5 54	2732	85 41 51	2719
	Regulus	W.	56 20 6	2618	57 58 36	2606	59 37 23	2593	61 16 27	2580
	Antares	E.	43 37 8	2607	41 58 23	2596	40 19 22	2585	38 40 6	2573
	SATURN	E.	58 56 38	2591	57 17 30	2578	55 38 5	2566	53 58 24	2554
	α Aquilæ	E.	97 17 48	3095	95 49 32	3080	94 20 58	3066	92 52 7	3052
25	Pollux	W.	106 27 21	2558	108 7 14	2548	109 47 21	2538	111 27 41	2530
	MARS	W.	93 45 34	2663	95 23 4	2652	97 0 49	2641	98 38 48	2632
	Regulus	W.	69 36 1	2522	71 16 44	2511	72 57 42	2500	74 38 55	2489
	Antares	E.	30 20 5	2523	28 39 24	2515	26 58 32	2507	25 17 29	2499
	SATURN	E.	45 36 0	2499	43 54 46	2489	42 13 17	2479	40 31 34	2470
	α Aquilæ	E.	85 24 5	3000	83 53 52	2992	82 23 29	2985	80 52 58	2980
26	MARS	W.	106 52 2	2584	108 31 19	2576	110 10 47	2568	111 50 26	2560
	Regulus	W.	83 8 34	2441	84 51 10	2433	86 33 58	2424	88 16 58	2417
	Spica	W.	29 5 13	2445	30 47 43	2435	32 30 28	2425	34 13 27	2416
	SATURN	E.	31 59 44	2426	30 16 46	2418	28 33 37	2412	26 50 19	2405
	α Aquilæ	E.	73 19 8	2970	71 48 18	2973	70 17 31	2976	68 46 48	2981
	Fomalhaut	E.	98 58 3	2885	97 25 25	2873	95 52 32	2862	94 19 25	2852
27	Regulus	W.	96 54 42	2380	98 38 45	2374	100 22 57	2368	102 7 17	2362
	Spica	W.	42 51 30	2375	44 35 40	2368	46 20 1	2362	48 4 31	2355
	α Aquilæ	E.	61 15 39	3036	59 46 11	3055	58 17 6	3075	56 48 26	3098
	Fomalhaut	E.	86 30 57	2817	84 56 51	2813	83 22 40	2810	81 48 25	2808
28	Spica	W.	56 49 10	2328	58 34 28	2324	60 19 52	2320	62 5 22	2316
	JUPITER	W.	44 24 46	2325	46 10 9	2318	47 55 42	2312	49 41 24	2307
	α Aquilæ	E.	49 33 41	3275	48 9 0	3325	46 45 17	3381	45 22 39	3446
	Fomalhaut	E.	73 57 8	2818	72 23 3	2823	70 49 5	2830	69 15 16	2839
	α Pegasi	E.	92 58 44	2460	91 16 34	2455	89 34 17	2451	87 51 55	2448
	VENUS	E.	103 4 50	2738	101 29 1	2734	99 53 6	2729	98 17 5	2725
29	Spica	W.	70 54 8	2301	72 40 6	2299	74 26 7	2297	76 12 11	2295
	JUPITER	W.	58 31 41	2285	60 18 2	2283	62 4 27	2280	63 50 56	2277
	Fomalhaut	E.	61 29 44	2909	59 57 36	2929	58 25 54	2951	56 54 40	2977
	α Pegasi	E.	79 19 10	2439	77 36 31	2438	75 53 51	2439	74 11 12	2440
	VENUS	E.	90 15 47	2710	88 39 20	2707	87 2 49	2705	85 26 16	2703
30	Spica	W.	85 3 6	2289	86 49 22	2289	88 35 38	2288	90 21 55	2288
	JUPITER	W.	72 44 9	2269	74 30 54	2268	76 17 41	2267	78 4 29	2266
	Antares	W.	39 30 24	2295	41 16 31	2294	43 2 40	2293	44 48 50	2291
	Fomalhaut	E.	49 27 52	3158	48 0 53	3208	46 34 53	3264	45 9 59	3325
	α Pegasi	E.	65 38 30	2453	63 56 10	2458	62 13 57	2463	60 31 52	2469
	VENUS	E.	77 23 3	2699	75 46 22	2698	74 9 40	2699	72 32 59	2699
	SUN	E.	112 56 33	2604	111 17 44	2604	109 38 54	2603	108 0 3	2602

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Mon.	1	<sup>h</sup> 2 <sup>m</sup> 33 <sup>s</sup> 47.24	9.542	N. 15° 5' 46.1	+45.34	15° 54.30	66.07	<sup>m</sup> 2 <sup>s</sup> 59.56	0.313
Tues.	2	2 37 36.53	9.566	15 23 46.8	44.71	15 54.06	66.15	3 6.80	0.290
Wed.	3	2 41 26.40	9.590	15 41 32.2	44.07	15 53.82	66.23	3 13.48	0.266
Thur.	4	2 45 16.83	9.613	15 59 2.2	+43.42	15 53.58	66.31	3 19.58	0.242
Frid.	5	2 49 7.84	9.637	16 16 16.4	42.76	15 53.35	66.39	3 25.11	0.218
Sat.	6	2 52 59.43	9.661	16 33 14.4	42.08	15 53.12	66.47	3 30.07	0.194
SUN.	7	2 56 51.60	9.686	16 49 56.0	+41.38	15 52.89	66.55	3 34.44	0.170
Mon.	8	3 0 44.35	9.710	17 6 20.8	40.67	15 52.67	66.63	3 38.24	0.146
Tues.	9	3 4 37.68	9.734	17 22 28.5	39.96	15 52.45	66.71	3 41.45	0.122
Wed.	10	3 8 31.59	9.758	17 38 18.8	+39.23	15 52.23	66.79	3 44.09	0.098
Thur.	11	3 12 26.07	9.782	17 53 51.3	38.48	15 52.02	66.87	3 46.16	0.074
Frid.	12	3 16 21.13	9.806	18 9 5.9	37.72	15 51.82	66.96	3 47.66	0.050
Sat.	13	3 20 16.75	9.829	18 24 2.1	+36.95	15 51.62	67.04	3 48.59	0.027
SUN.	14	3 24 12.93	9.853	18 38 39.7	36.17	15 51.42	67.12	3 48.96	0.004
Mon.	15	3 28 9.67	9.876	18 52 58.4	35.38	15 51.22	67.20	3 48.78	0.019
Tues.	16	3 32 6.96	9.899	19 6 58.0	+34.58	15 51.03	67.29	3 48.04	0.042
Wed.	17	3 36 4.80	9.921	19 20 38.2	33.76	15 50.84	67.37	3 46.76	0.065
Thur.	18	3 40 3.19	9.944	19 33 58.6	32.93	15 50.66	67.45	3 44.94	0.087
Frid.	19	3 44 2.10	9.966	19 46 59.1	+32.10	15 50.48	67.53	3 42.58	0.109
Sat.	20	3 48 1.56	9.988	19 59 39.4	31.25	15 50.30	67.60	3 39.69	0.131
SUN.	21	3 52 1.54	10.010	20 11 59.3	30.39	15 50.13	67.68	3 36.28	0.153
Mon.	22	3 56 2.05	10.032	20 23 58.5	+29.52	15 49.96	67.76	3 32.34	0.175
Tues.	23	4 0 3.07	10.053	20 35 36.7	28.65	15 49.79	67.83	3 27.88	0.196
Wed.	24	4 4 4.61	10.075	20 46 53.9	27.77	15 49.62	67.90	3 22.91	0.218
Thur.	25	4 8 6.66	10.096	20 57 49.6	+26.87	15 49.45	67.97	3 17.44	0.239
Frid.	26	4 12 9.21	10.117	21 8 23.8	25.96	15 49.29	68.04	3 11.46	0.260
Sat.	27	4 16 12.25	10.137	21 18 36.1	25.05	15 49.13	68.11	3 5.00	0.280
SUN.	28	4 20 15.78	10.157	21 28 26.4	+24.13	15 48.97	68.17	2 58.04	0.300
Mon.	29	4 24 19.78	10.176	21 37 54.5	23.20	15 48.81	68.23	2 50.62	0.319
Tues.	30	4 28 24.25	10.195	21 47 0.1	22.26	15 48.66	68.29	2 42.73	0.338
Wed.	31	4 32 29.17	10.214	21 55 43.1	21.31	15 48.51	68.35	2 34.39	0.357
Thur.	32	4 36 34.53	10.232	N. 22° 4' 3.2	+20.36	15 48.37	68.41	2 25.61	0.374

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Mon.	1	2 33 47.71	9.543	N. 15 5 48.4	+45.34	2 59.58	0.313	2 36 47.29
Tues.	2	2 37 37.03	9.566	15 23 49.1	44.71	3 6.82	0.290	2 40 43.85
Wed.	3	2 41 26.91	9.590	15 41 34.6	44.07	3 13.49	0.266	2 44 40.40
Thur.	4	2 45 17.36	9.614	15 59 4.7	+43.42	3 19.60	0.242	2 48 36.96
Frid.	5	2 49 8.39	9.638	16 16 18.9	42.76	3 25.13	0.218	2 52 33.52
Sat.	6	2 52 59.99	9.662	16 33 16.9	42.08	3 30.08	0.194	2 56 30.07
SUN.	7	2 56 52.17	9.686	16 49 58.5	+41.38	3 34.46	0.170	3 0 26.63
Mon.	8	3 0 44.93	9.710	17 6 23.3	40.67	3 38.25	0.146	3 4 23.18
Tues.	9	3 4 38.28	9.735	17 22 31.0	39.96	3 41.46	0.122	3 8 19.74
Wed.	10	3 8 32.19	9.759	17 38 21.2	+39.23	3 44.10	0.098	3 12 16.29
Thur.	11	3 12 26.68	9.782	17 53 53.8	38.48	3 46.17	0.074	3 16 12.85
Frid.	12	3 16 21.74	9.806	18 9 8.3	37.72	3 47.66	0.050	3 20 9.40
Sat.	13	3 20 17.37	9.829	18 24 4.5	+36.95	3 48.59	0.027	3 24 5.96
SUN.	14	3 24 13.55	9.853	18 38 42.1	36.17	3 48.96	0.004	3 28 2.52
Mon.	15	3 28 10.30	9.876	18 53 0.7	35.38	3 48.77	0.019	3 31 59.07
Tues.	16	3 32 7.59	9.899	19 7 0.2	+34.58	3 48.04	0.042	3 35 55.63
Wed.	17	3 36 5.43	9.921	19 20 40.3	33.76	3 46.76	0.065	3 39 52.18
Thur.	18	3 40 3.81	9.944	19 34 0.7	32.93	3 44.93	0.087	3 43 48.74
Frid.	19	3 44 2.72	9.966	19 47 1.1	+32.10	3 42.58	0.109	3 47 45.30
Sat.	20	3 48 2.17	9.988	19 59 41.4	31.25	3 39.69	0.131	3 51 41.86
SUN.	21	3 52 2.14	10.010	20 12 1.2	30.39	3 36.27	0.153	3 55 38.41
Mon.	22	3 56 2.64	10.032	20 24 0.3	+29.52	3 32.33	0.175	3 59 34.97
Tues.	23	4 0 3.65	10.053	20 35 38.4	28.65	3 27.87	0.196	4 3 31.53
Wed.	24	4 4 5.18	10.074	20 46 55.5	27.77	3 22.90	0.218	4 7 28.08
Thur.	25	4 8 7.21	10.095	20 57 51.2	+26.87	3 17.42	0.239	4 11 24.64
Frid.	26	4 12 9.75	10.116	21 8 25.2	25.96	3 11.45	0.260	4 15 21.20
Sat.	27	4 16 12.77	10.136	21 18 37.5	25.05	3 4.98	0.280	4 19 17.75
SUN.	28	4 20 16.28	10.156	21 28 27.7	+24.13	2 58.03	0.300	4 23 14.31
Mon.	29	4 24 20.26	10.176	21 37 55.6	23.20	2 50.60	0.319	4 27 10.87
Tues.	30	4 28 24.71	10.195	21 47 1.2	22.26	2 42.71	0.338	4 31 7.42
Wed.	31	4 32 29.61	10.213	21 55 44.0	21.31	2 34.37	0.357	4 35 3.98
Thur.	32	4 36 34.95	10.231	N. 22 4 4.1	+20.36	2 25.59	0.375	4 39 0.54

**NOTE.**—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,  
+9°.8565.  
(Table III)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	121	40 52 51.6	52 18.9	145.45	+ 0.17	0.0034894	+46.1	21 19 42.48
2	122	41 51 1.7	50 28.9	145.39	0.29	0.0035996	45.7	21 15 46.58
3	123	42 49 10.6	48 37.6	145.34	0.38	0.0037088	45.2	21 11 50.67
4	124	43 47 17.9	46 44.8	145.28	+ 0.45	0.0038168	+44.7	21 7 54.76
5	125	44 45 23.8	44 50.6	145.22	0.49	0.0039233	44.1	21 3 58.85
6	126	45 43 28.3	42 54.9	145.16	0.51	0.0040284	43.5	21 0 2.94
7	127	46 41 31.3	40 57.8	145.10	+ 0.48	0.0041318	+42.8	20 56 7.03
8	128	47 39 33.0	38 59.3	145.04	0.44	0.0042336	42.0	20 52 11.12
9	129	48 37 33.0	36 59.2	144.98	0.37	0.0043333	41.2	20 48 15.21
10	130	49 35 31.6	34 57.6	144.91	+ 0.27	0.0044312	+40.4	20 44 19.30
11	131	50 33 28.5	32 54.4	144.84	0.15	0.0045272	39.6	20 40 23.39
12	132	51 31 23.8	30 49.5	144.77	+ 0.02	0.0046214	38.8	20 36 27.48
13	133	52 29 17.5	28 43.1	144.70	- 0.11	0.0047136	+38.1	20 32 31.57
14	134	53 27 9.4	26 34.8	144.63	0.24	0.0048039	37.4	20 28 35.66
15	135	54 24 59.8	24 25.1	144.56	0.37	0.0048924	36.7	20 24 39.75
16	136	55 22 48.3	22 13.4	144.49	- 0.49	0.0049794	+36.0	20 20 43.84
17	137	56 20 35.2	20 0.2	144.42	0.57	0.0050646	35.3	20 16 47.93
18	138	57 18 20.4	17 45.2	144.35	0.64	0.0051485	34.7	20 12 52.02
19	139	58 16 3.9	15 28.6	144.28	- 0.68	0.0052309	+34.1	20 8 56.10
20	140	59 13 45.9	13 10.4	144.22	0.68	0.0053121	33.6	20 5 0.19
21	141	60 11 26.4	10 50.8	144.15	0.66	0.0053921	33.1	20 1 4.28
22	142	61 9 5.3	8 29.5	144.09	- 0.60	0.0054709	+32.6	19 57 8.37
23	143	62 6 42.8	6 6.9	144.03	0.52	0.0055486	32.2	19 53 12.46
24	144	63 4 19.1	3 43.0	143.98	0.41	0.0056253	31.8	19 49 16.55
25	145	64 1 54.1	1 17.8	143.93	- 0.29	0.0057011	+31.4	19 45 20.64
26	146	64 59 28.0	58 51.6	143.89	0.17	0.0057758	30.9	19 41 24.73
27	147	65 57 0.7	56 24.1	143.85	- 0.04	0.0058494	30.4	19 37 28.82
28	148	66 54 32.6	53 55.8	143.81	+ 0.09	0.0059218	+29.9	19 33 32.91
29	149	67 52 3.4	51 26.5	143.77	0.21	0.0059928	29.3	19 29 36.99
30	150	68 49 33.5	48 56.4	143.74	0.30	0.0060626	28.7	19 25 41.08
31	151	69 47 2.8	46 25.5	143.70	0.37	0.0061308	28.0	19 21 45.17
32	152	70 44 31.3	43 53.8	143.67	+ 0.42	0.0061971	+27.3	19 17 49.26
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	16 11.2	16 11.3	59 17.9	+0.08	59 18.2	-0.03	17 46.8	2.26	21.2
2	16 11.1	16 10.5	59 17.3	-0.13	59 15.1	0.23	18 39.6	2.15	22.2
3	16 9.6	16 8.3	59 11.8	0.33	59 7.3	0.42	19 30.1	2.07	23.2
4	16 6.8	16 4.9	59 1.6	-0.32	58 54.8	-0.62	20 19.3	2.03	24.2
5	16 2.8	16 0.2	58 46.8	0.72	58 37.5	0.82	21 8.0	2.04	25.2
6	15 57.4	15 54.2	58 27.1	0.92	58 15.4	1.02	21 57.2	2.07	26.2
7	15 50.7	15 46.9	58 2.6	-1.12	57 48.6	-1.21	22 47.7	2.13	27.2
8	15 42.8	15 38.5	57 33.6	1.28	57 17.7	1.35	23 39.6	2.19	28.2
9	15 34.0	15 29.3	57 1.1	1.40	56 44.0	1.43	6		29.2
10	15 24.6	15 19.9	56 26.7	-1.45	56 9.3	-1.44	0 32.7	2.23	0.8
11	15 15.2	15 10.7	55 52.1	1.40	55 35.6	1.34	1 26.1	2.22	1.8
12	15 6.4	15 2.4	55 19.9	1.26	55 5.2	1.16	2 18.8	2.16	2.8
13	14 58.8	14 55.7	54 52.0	-1.03	54 40.4	-0.89	3 9.7	2.07	3.8
14	14 53.0	14 50.9	54 30.6	0.73	54 22.8	0.55	3 58.2	1.97	4.8
15	14 49.4	14 48.5	54 17.3	-0.36	54 14.2	-0.16	4 44.1	1.86	5.8
16	14 48.3	14 48.8	54 13.5	+0.05	54 15.3	+0.26	5 27.8	1.78	6.8
17	14 50.0	14 51.9	54 19.7	0.48	54 26.7	0.69	6 10.0	1.73	7.8
18	14 54.6	14 57.8	54 36.3	0.90	54 48.3	1.10	6 51.5	1.73	8.8
19	15 1.7	15 6.3	55 2.7	+1.29	55 19.3	+1.46	7 33.2	1.76	9.8
20	15 11.3	15 16.8	55 37.8	1.61	55 58.0	1.74	8 16.2	1.83	10.8
21	15 22.7	15 28.9	56 19.7	1.84	56 42.3	1.91	9 1.6	1.96	11.8
22	15 35.2	15 41.6	57 5.6	+1.95	57 29.0	+1.94	9 50.4	2.11	12.8
23	15 47.9	15 54.0	57 52.2	1.90	58 14.6	1.81	10 43.2	2.29	13.8
24	15 59.7	16 5.0	58 35.7	1.69	58 55.1	1.53	11 40.2	2.45	14.8
25	16 9.8	16 13.8	59 12.5	+1.34	59 27.3	+1.12	12 40.5	2.56	15.8
26	16 17.1	16 19.6	59 39.3	0.88	59 48.5	0.63	13 42.2	2.57	16.8
27	16 21.2	16 22.1	59 54.6	+0.38	59 57.8	+0.14	14 43.0	2.49	17.8
28	16 22.1	16 21.5	59 58.0	-0.09	59 55.5	-0.31	15 41.1	2.35	18.8
29	16 20.1	16 18.2	59 50.6	0.50	59 43.4	0.67	16 35.9	2.22	19.8
30	16 15.7	16 12.8	59 34.4	0.82	59 23.8	0.94	17 27.6	2.10	20.8
31	16 9.6	16 6.1	59 11.9	1.03	58 58.9	1.11	18 17.1	2.03	21.8
32	16 2.3	15 58.4	58 45.2	-1.17	58 30.9	-1.20	19 5.5	2.01	22.8



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 1.					WEDNESDAY 3.				
0	19 44 8.71	2.4208	S. 19 10 21.9	9.040	0	21 35 17.92	2.2193	S. 10 3 52.3	13.199
1	19 46 33.83	2.4164	19 1 15.9	9.159	1	21 37 30.98	2.2160	9 50 38.8	13.252
2	19 48 58.68	2.4120	18 52 2.8	9.276	2	21 39 43.84	2.2127	9 37 22.1	13.303
3	19 51 23.27	2.4076	18 42 42.8	9.392	3	21 41 56.50	2.2094	9 24 2.4	13.353
4	19 53 47.59	2.4031	18 33 15.8	9.507	4	21 44 8.97	2.2063	9 10 39.7	13.403
5	19 56 11.64	2.3986	18 23 42.0	9.620	5	21 46 21.25	2.2031	8 57 14.1	13.449
6	19 58 35.42	2.3941	18 14 1.4	9.733	6	21 48 33.34	2.1999	8 43 45.8	13.494
7	20 0 58.93	2.3896	18 4 14.1	9.843	7	21 50 45.25	2.1970	8 30 14.8	13.539
8	20 3 22.17	2.3850	17 54 20.2	9.953	8	21 52 56.98	2.1941	8 16 41.1	13.583
9	20 5 45.13	2.3805	17 44 19.8	10.061	9	21 55 8.54	2.1912	8 3 4.9	13.623
10	20 8 7.83	2.3760	17 34 12.9	10.168	10	21 57 19.92	2.1883	7 49 26.3	13.663
11	20 10 30.25	2.3715	17 23 59.7	10.273	11	21 59 31.14	2.1856	7 35 45.3	13.703
12	20 12 52.41	2.3670	17 13 40.2	10.377	12	22 1 42.19	2.1828	7 22 1.9	13.741
13	20 15 14.29	2.3625	17 3 14.5	10.479	13	22 3 53.08	2.1802	7 8 16.4	13.777
14	20 17 35.91	2.3580	16 52 42.7	10.580	14	22 6 3.81	2.1776	6 54 28.7	13.812
15	20 19 57.25	2.3534	16 42 4.9	10.680	15	22 8 14.39	2.1751	6 40 39.0	13.844
16	20 22 18.32	2.3489	16 31 21.1	10.779	16	22 10 24.82	2.1726	6 26 47.4	13.877
17	20 24 39.12	2.3444	16 20 31.4	10.877	17	22 12 35.10	2.1702	6 12 53.8	13.908
18	20 26 59.65	2.3399	16 9 35.9	10.973	18	22 14 45.24	2.1678	5 58 58.5	13.937
19	20 29 19.91	2.3354	15 58 34.7	11.067	19	22 16 55.24	2.1656	5 45 1.4	13.965
20	20 31 39.90	2.3310	15 47 27.9	11.160	20	22 19 5.11	2.1633	5 31 2.7	13.992
21	20 33 59.63	2.3266	15 36 15.5	11.252	21	22 21 14.84	2.1612	5 17 2.4	14.018
22	20 36 19.09	2.3222	15 24 57.7	11.342	22	22 23 24.45	2.1591	5 3 0.6	14.041
23	20 38 38.29	2.3178	S. 15 13 34.5	11.430	23	22 25 33.93	2.1570	S. 4 48 57.5	14.063
TUESDAY 2.					THURSDAY 4.				
0	20 40 57.22	2.3133	S. 15 2 6.1	11.518	0	22 27 43.29	2.1551	S. 4 34 53.0	14.085
1	20 43 15.89	2.3091	14 50 32.4	11.604	1	22 29 52.54	2.1533	4 20 47.3	14.105
2	20 45 34.31	2.3048	14 38 53.6	11.689	2	22 32 1.68	2.1514	4 6 40.4	14.123
3	20 47 52.46	2.3004	14 27 9.7	11.773	3	22 34 10.71	2.1496	3 52 32.5	14.140
4	20 50 10.36	2.2963	14 15 20.9	11.854	4	22 36 19.63	2.1479	3 38 23.6	14.157
5	20 52 28.01	2.2920	14 3 27.2	11.935	5	22 38 28.46	2.1463	3 24 13.7	14.172
6	20 54 45.40	2.2878	13 51 28.7	12.014	6	22 40 37.19	2.1447	3 10 3.0	14.185
7	20 57 2.54	2.2836	13 39 25.5	12.092	7	22 42 45.82	2.1432	2 55 51.5	14.197
8	20 59 19.43	2.2795	13 27 17.7	12.168	8	22 44 54.37	2.1418	2 41 39.4	14.208
9	21 1 36.08	2.2755	13 15 5.3	12.243	9	22 47 2.83	2.1403	2 27 26.6	14.218
10	21 3 52.49	2.2714	13 2 48.5	12.317	10	22 49 11.21	2.1390	2 13 13.3	14.226
11	21 6 8.65	2.2673	12 50 27.3	12.390	11	22 51 19.51	2.1378	1 58 59.5	14.233
12	21 8 24.57	2.2633	12 38 1.8	12.460	12	22 53 27.74	2.1366	1 44 45.3	14.238
13	21 10 40.25	2.2594	12 25 32.1	12.529	13	22 55 35.90	2.1355	1 30 30.9	14.242
14	21 12 55.70	2.2556	12 12 58.3	12.597	14	22 57 44.00	2.1345	1 16 16.3	14.245
15	21 15 10.92	2.2518	12 0 20.5	12.663	15	22 59 52.04	2.1335	1 2 1.5	14.247
16	21 17 25.91	2.2480	11 47 38.7	12.728	16	23 2 0.02	2.1326	0 47 46.7	14.247
17	21 19 40.68	2.2443	11 34 53.1	12.792	17	23 4 7.95	2.1318	0 33 31.9	14.246
18	21 21 55.22	2.2405	11 22 3.7	12.854	18	23 6 15.83	2.1309	0 19 17.2	14.244
19	21 24 9.54	2.2368	11 9 10.6	12.916	19	23 8 23.66	2.1302	S. 0 5 2.6	14.241
20	21 26 23.64	2.2332	10 56 13.8	12.976	20	23 10 31.45	2.1295	N. 0 9 11.7	14.236
21	21 28 37.52	2.2297	10 43 13.5	13.033	21	23 12 39.20	2.1289	0 23 25.7	14.229
22	21 30 51.20	2.2262	10 30 9.8	13.090	22	23 14 46.92	2.1284	0 37 39.2	14.222
23	21 33 4.66	2.2227	10 17 2.7	13.146	23	23 16 54.61	2.1279	0 51 52.3	14.213
24	21 35 17.92	2.2193	S. 10 3 52.3	13.199	24	23 19 2.27	2.1275	N. 1 6 4.8	14.203

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 5.					SUNDAY 7.				
0	23 19 2.27	2.1275	N. 1 6 4.8	14.203	0	1 1 47.54	2.1733	N. 11 52 22.3	12.253
1	23 21 9.91	2.1272	1 20 16.7	14.202	1	1 3 57.99	2.1752	12 4 35.4	12.183
2	23 23 17.53	2.1269	1 34 27.8	14.179	2	1 6 8.56	2.1773	12 16 44.2	12.111
3	23 25 25.14	2.1267	1 48 38.2	14.166	3	1 8 19.26	2.1794	12 28 48.7	12.039
4	23 27 32.74	2.1266	2 2 47.7	14.151	4	1 10 30.09	2.1815	12 40 48.9	11.966
5	23 29 40.33	2.1265	2 16 56.3	14.134	5	1 12 41.04	2.1835	12 52 44.6	11.891
6	23 31 47.92	2.1264	2 31 3.8	14.116	6	1 14 52.11	2.1857	13 4 35.8	11.815
7	23 33 55.50	2.1264	2 45 10.2	14.098	7	1 17 3.32	2.1879	13 16 22.4	11.738
8	23 36 3.09	2.1266	2 59 15.5	14.078	8	1 19 14.66	2.1901	13 28 4.4	11.660
9	23 38 10.69	2.1268	3 13 19.5	14.056	9	1 21 26.13	2.1923	13 39 41.6	11.580
10	23 40 18.30	2.1269	3 27 22.2	14.033	10	1 23 37.73	2.1945	13 51 14.0	11.500
11	23 42 25.92	2.1271	3 41 23.5	14.008	11	1 25 49.47	2.1968	14 2 41.6	11.419
12	23 44 33.55	2.1274	3 55 23.2	13.983	12	1 28 1.34	2.1990	14 14 4.3	11.337
13	23 46 41.21	2.1279	4 9 21.4	13.957	13	1 30 13.35	2.2013	14 25 22.0	11.253
14	23 48 48.90	2.1283	4 23 18.0	13.929	14	1 32 25.49	2.2036	14 36 34.6	11.168
15	23 50 56.61	2.1288	4 37 12.9	13.900	15	1 34 37.78	2.2059	14 47 42.1	11.083
16	23 53 4.36	2.1294	4 51 6.0	13.870	16	1 36 50.20	2.2082	14 58 44.5	10.996
17	23 55 12.14	2.1300	5 4 57.3	13.838	17	1 39 2.76	2.2105	15 9 41.6	10.908
18	23 57 19.96	2.1307	5 18 46.6	13.805	18	1 41 15.46	2.2128	15 20 33.4	10.819
19	23 59 27.82	2.1314	5 32 33.9	13.772	19	1 43 28.30	2.2151	15 31 19.9	10.729
20	0 1 35.73	2.1323	5 46 19.2	13.737	20	1 45 41.27	2.2174	15 42 0.9	10.638
21	0 3 43.69	2.1331	6 0 2.3	13.699	21	1 47 54.39	2.2199	15 52 36.5	10.547
22	0 5 51.70	2.1339	6 13 43.1	13.662	22	1 50 7.66	2.2223	16 3 6.5	10.453
23	0 7 59.76	2.1348	N. 6 27 21.7	13.623	23	1 52 21.06	2.2245	N. 16 13 30.9	10.359
SATURDAY 6.					MONDAY 8.				
0	0 10 7.88	2.1358	N. 6 40 57.9	13.583	0	1 54 34.60	2.2268	N. 16 23 49.6	10.264
1	0 12 16.06	2.1369	6 54 31.6	13.541	1	1 56 48.28	2.2293	16 34 2.6	10.168
2	0 14 24.31	2.1380	7 8 2.8	13.498	2	1 59 2.11	2.2317	16 44 9.8	10.072
3	0 16 32.62	2.1391	7 21 31.4	13.454	3	2 1 16.08	2.2339	16 54 11.2	9.974
4	0 18 41.00	2.1403	7 34 57.3	13.409	4	2 3 30.18	2.2362	17 4 6.7	9.875
5	0 20 49.46	2.1417	7 48 20.5	13.363	5	2 5 44.42	2.2386	17 13 56.2	9.775
6	0 22 58.00	2.1429	8 1 40.9	13.315	6	2 7 58.81	2.2409	17 23 39.7	9.674
7	0 25 6.61	2.1442	8 14 58.3	13.266	7	2 10 13.33	2.2432	17 33 17.1	9.573
8	0 27 15.30	2.1456	8 28 12.8	13.217	8	2 12 27.99	2.2454	17 42 48.4	9.470
9	0 29 24.08	2.1470	8 41 24.3	13.165	9	2 14 42.78	2.2477	17 52 13.5	9.367
10	0 31 32.94	2.1485	8 54 32.6	13.113	10	2 16 57.71	2.2500	18 1 32.4	9.263
11	0 33 41.90	2.1500	9 7 37.8	13.059	11	2 19 12.78	2.2523	18 10 45.0	9.157
12	0 35 50.94	2.1515	9 20 39.7	13.004	12	2 21 27.98	2.2544	18 19 51.2	9.051
13	0 38 0.08	2.1532	9 33 38.3	12.948	13	2 23 43.31	2.2567	18 28 51.1	8.944
14	0 40 9.32	2.1548	9 46 33.4	12.890	14	2 25 58.78	2.2589	18 37 44.5	8.836
15	0 42 18.65	2.1564	9 59 25.1	12.832	15	2 28 14.38	2.2610	18 46 31.4	8.728
16	0 44 28.09	2.1582	10 12 13.2	12.772	16	2 30 30.10	2.2631	18 55 11.8	8.618
17	0 46 37.63	2.1599	10 24 57.7	12.711	17	2 32 45.95	2.2653	19 3 45.6	8.508
18	0 48 47.28	2.1618	10 37 38.5	12.649	18	2 35 1.93	2.2673	19 12 12.8	8.398
19	0 50 57.04	2.1636	10 50 15.6	12.587	19	2 37 18.03	2.2694	19 20 33.3	8.285
20	0 53 6.91	2.1654	11 2 48.9	12.523	20	2 39 34.26	2.2714	19 28 47.0	8.173
21	0 55 16.89	2.1673	11 15 18.3	12.457	21	2 41 50.60	2.2734	19 36 54.0	8.059
22	0 57 26.99	2.1693	11 27 43.7	12.389	22	2 44 7.07	2.2754	19 44 54.1	7.945
23	0 59 37.20	2.1713	11 40 5.0	12.322	23	2 46 23.65	2.2773	19 52 47.4	7.831
24	1 1 47.54	2.1733	N. 11 52 22.3	12.253	24	2 48 40.35	2.2793	N. 20 0 33.8	7.715

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 9.					THURSDAY 11.				
0	2 48 40.35	2.2793	N.20 0 33.8	7.715	0	4 39 16.96	2.3054	N.23 48 1.4	1.648
1	2 50 57.16	2.2811	20 8 13.2	7.598	1	4 41 35.25	2.3043	23 49 36.3	1.518
2	2 53 14.08	2.2828	20 15 45.6	7.482	2	4 43 53.47	2.3031	23 51 3.5	1.388
3	2 55 31.10	2.2846	20 23 11.0	7.364	3	4 46 11.62	2.3018	23 52 22.8	1.258
4	2 57 48.23	2.2864	20 30 29.3	7.246	4	4 48 29.69	2.3004	23 53 34.4	1.128
5	3 0 5.47	2.2881	20 37 40.5	7.127	5	4 50 47.67	2.2990	23 54 38.2	0.998
6	3 2 22.80	2.2897	20 44 44.5	7.007	6	4 53 5.57	2.2976	23 55 34.2	0.869
7	3 4 40.23	2.2913	20 51 41.3	6.887	7	4 55 23.38	2.2960	23 56 22.5	0.740
8	3 6 57.76	2.2929	20 58 30.9	6.767	8	4 57 41.09	2.2943	23 57 3.0	0.612
9	3 9 15.38	2.2944	21 5 13.3	6.646	9	4 59 58.70	2.2927	23 57 35.9	0.483
10	3 11 33.09	2.2958	21 11 48.4	6.523	10	5 2 16.21	2.2909	23 58 1.0	0.355
11	3 13 50.88	2.2973	21 18 16.1	6.401	11	5 4 33.61	2.2890	23 58 18.5	0.227
12	3 16 8.76	2.2987	21 24 36.5	6.278	12	5 6 50.89	2.2871	23 58 28.2	+ 0.098
13	3 18 26.72	2.3000	21 30 49.5	6.155	13	5 9 8.06	2.2852	23 58 30.3	- 0.028
14	3 20 44.76	2.3012	21 36 55.1	6.031	14	5 11 25.11	2.2832	23 58 24.8	0.155
15	3 23 2.86	2.3023	21 42 53.2	5.906	15	5 13 42.04	2.2810	23 58 11.7	0.282
16	3 25 21.04	2.3036	21 48 43.8	5.781	16	5 15 58.83	2.2788	23 57 51.0	0.408
17	3 27 39.29	2.3047	21 54 26.9	5.656	17	5 18 15.49	2.2766	23 57 22.8	0.533
18	3 29 57.60	2.3057	22 0 2.5	5.530	18	5 20 32.02	2.2743	23 56 47.0	0.659
19	3 32 15.97	2.3066	22 5 30.5	5.403	19	5 22 48.41	2.2719	23 56 3.7	0.784
20	3 34 34.39	2.3075	22 10 50.9	5.278	20	5 25 4.65	2.2695	23 55 12.9	0.908
21	3 36 52.87	2.3083	22 16 3.8	5.151	21	5 27 20.75	2.2670	23 54 14.7	1.033
22	3 39 11.39	2.3091	22 21 9.0	5.023	22	5 29 36.69	2.2644	23 53 9.0	1.157
23	3 41 29.96	2.3098	N.22 26 6.6	4.895	23	5 31 52.48	2.2618	N.23 51 55.9	1.280
WEDNESDAY 10.					FRIDAY 12.				
0	3 43 48.57	2.3105	N.22 30 56.4	4.767	0	5 34 8.10	2.2590	N.23 50 35.4	1.403
1	3 46 7.22	2.3111	22 35 38.6	4.639	1	5 36 23.56	2.2563	23 49 7.6	1.525
2	3 48 25.90	2.3116	22 40 13.1	4.511	2	5 38 38.86	2.2536	23 47 32.4	1.647
3	3 50 44.61	2.3121	22 44 39.9	4.383	3	5 40 53.99	2.2508	23 45 49.9	1.768
4	3 53 3.35	2.3125	22 48 59.0	4.253	4	5 43 8.95	2.2478	23 44 0.2	1.889
5	3 55 22.11	2.3128	22 53 10.3	4.123	5	5 45 23.73	2.2448	23 42 3.2	2.009
6	3 57 40.89	2.3131	22 57 13.8	3.994	6	5 47 38.33	2.2418	23 39 59.1	2.128
7	3 59 59.68	2.3132	23 1 9.6	3.865	7	5 49 52.75	2.2388	23 37 47.8	2.248
8	4 2 18.48	2.3133	23 4 57.6	3.735	8	5 52 6.98	2.2356	23 35 29.3	2.367
9	4 4 37.28	2.3133	23 8 37.8	3.605	9	5 54 21.02	2.2324	23 33 3.7	2.485
10	4 6 56.08	2.3133	23 12 10.2	3.475	10	5 56 34.87	2.2293	23 30 31.1	2.603
11	4 9 14.88	2.3132	23 15 34.8	3.344	11	5 58 48.53	2.2260	23 27 51.4	2.719
12	4 11 33.67	2.3131	23 18 51.5	3.213	12	6 1 1.99	2.2227	23 25 4.8	2.835
13	4 13 52.45	2.3128	23 22 0.4	3.083	13	6 3 15.25	2.2193	23 22 11.2	2.951
14	4 16 11.21	2.3125	23 25 1.5	2.953	14	6 5 28.31	2.2159	23 19 10.7	3.066
15	4 18 29.95	2.3122	23 27 54.8	2.823	15	6 7 41.16	2.2124	23 16 3.3	3.180
16	4 20 48.67	2.3118	23 30 40.2	2.691	16	6 9 53.80	2.2089	23 12 49.1	3.293
17	4 23 7.36	2.3112	23 33 17.7	2.561	17	6 12 6.23	2.2054	23 9 28.1	3.407
18	4 25 26.01	2.3106	23 35 47.5	2.431	18	6 14 18.45	2.2019	23 6 0.3	3.520
19	4 27 44.63	2.3099	23 38 9.4	2.299	19	6 16 30.46	2.1983	23 2 25.7	3.632
20	4 30 3.20	2.3091	23 40 23.4	2.169	20	6 18 42.25	2.1947	22 58 44.5	3.742
21	4 32 21.72	2.3083	23 42 29.7	2.039	21	6 20 53.82	2.1910	22 54 56.7	3.853
22	4 34 40.19	2.3073	23 44 28.1	1.908	22	6 23 5.17	2.1873	22 51 2.2	3.963
23	4 36 58.60	2.3064	23 46 18.6	1.778	23	6 25 16.29	2.1835	22 47 1.2	4.072
24	4 39 16.96	2.3054	N.23 48 1.4	1.648	24	6 27 27.19	2.1798	N.22 42 53.6	4.180

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 13.					MONDAY 15.				
0	6 27 27.19	2.1798	N.22 42 53.6	4.180	0	8 7 29.38	1.9894	N.17 31 31.2	8.504
1	6 29 37.86	2.1760	22 38 39.6	4.287	1	8 9 28.63	1.9857	17 22 58.8	8.576
2	6 31 48.31	2.1722	22 34 19.2	4.394	2	8 11 27.66	1.9821	17 14 22.1	8.647
3	6 33 58.52	2.1684	22 29 52.3	4.501	3	8 13 26.48	1.9785	17 5 41.2	8.717
4	6 36 8.51	2.1645	22 25 19.1	4.606	4	8 15 25.08	1.9749	16 56 56.1	8.786
5	6 38 18.26	2.1605	22 20 39.6	4.711	5	8 17 23.47	1.9714	16 48 6.9	8.855
6	6 40 27.77	2.1566	22 15 53.8	4.814	6	8 19 21.65	1.9678	16 39 13.5	8.923
7	6 42 37.05	2.1527	22 11 1.9	4.918	7	8 21 19.61	1.9643	16 30 16.1	8.990
8	6 44 46.09	2.1487	22 6 3.7	5.021	8	8 23 17.37	1.9609	16 21 14.7	9.057
9	6 46 54.89	2.1448	22 0 59.4	5.123	9	8 25 14.92	1.9575	16 12 9.3	9.123
10	6 49 3.46	2.1408	21 55 49.0	5.223	10	8 27 12.27	1.9542	16 2 59.9	9.189
11	6 51 11.78	2.1367	21 50 32.6	5.324	11	8 29 9.42	1.9508	15 53 46.6	9.253
12	6 53 19.86	2.1327	21 45 10.1	5.424	12	8 31 6.37	1.9475	15 44 29.5	9.317
13	6 55 27.70	2.1287	21 39 41.7	5.523	13	8 33 3.12	1.9443	15 35 8.6	9.379
14	6 57 35.30	2.1247	21 34 7.4	5.621	14	8 34 59.68	1.9411	15 25 44.0	9.442
15	6 59 42.66	2.1206	21 28 27.2	5.718	15	8 36 56.05	1.9379	15 16 15.6	9.504
16	7 1 49.77	2.1164	21 22 41.3	5.814	16	8 38 52.23	1.9348	15 6 43.5	9.566
17	7 3 56.63	2.1123	21 16 49.5	5.911	17	8 40 48.22	1.9316	14 57 7.7	9.626
18	7 6 3.25	2.1083	21 10 52.0	6.006	18	8 42 44.02	1.9286	14 47 28.4	9.685
19	7 8 9.63	2.1043	21 4 48.8	6.100	19	8 44 39.65	1.9257	14 37 45.5	9.744
20	7 10 15.77	2.1003	20 58 40.0	6.193	20	8 46 35.10	1.9227	14 27 59.1	9.803
21	7 12 21.66	2.0961	20 52 25.6	6.287	21	8 48 30.37	1.9197	14 18 9.2	9.861
22	7 14 27.30	2.0920	20 46 5.6	6.378	22	8 50 25.46	1.9168	14 8 15.8	9.918
23	7 16 32.70	2.0879	N.20 39 40.2	6.468	23	8 52 20.39	1.9140	N.13 58 19.1	9.974
SUNDAY 14.					TUESDAY 16.				
0	7 18 37.85	2.0838	N.20 33 9.4	6.559	0	8 54 15.14	1.9112	N.13 48 19.0	10.029
1	7 20 42.75	2.0797	20 26 33.1	6.649	1	8 56 9.73	1.9085	13 38 15.6	10.084
2	7 22 47.41	2.0757	20 19 51.5	6.738	2	8 58 4.16	1.9058	13 28 8.9	10.138
3	7 24 51.83	2.0716	20 13 4.5	6.827	3	8 59 58.43	1.9032	13 17 59.0	10.192
4	7 26 56.00	2.0675	20 6 12.3	6.914	4	9 1 52.54	1.9006	13 7 45.9	10.246
5	7 28 59.93	2.0635	19 59 14.8	7.001	5	9 3 46.50	1.8981	12 57 29.5	10.298
6	7 31 3.62	2.0594	19 52 12.2	7.087	6	9 5 40.31	1.8956	12 47 10.1	10.349
7	7 33 7.06	2.0553	19 45 4.4	7.173	7	9 7 33.97	1.8931	12 36 47.6	10.401
8	7 35 10.26	2.0513	19 37 51.5	7.257	8	9 9 27.48	1.8907	12 26 22.0	10.452
9	7 37 13.22	2.0473	19 30 33.6	7.340	9	9 11 20.85	1.8883	12 15 53.4	10.502
10	7 39 15.94	2.0434	19 23 10.7	7.423	10	9 13 14.08	1.8861	12 5 21.8	10.551
11	7 41 18.43	2.0394	19 15 42.9	7.504	11	9 15 7.18	1.8838	11 54 47.3	10.598
12	7 43 20.67	2.0353	19 8 10.2	7.586	12	9 17 0.14	1.8816	11 44 10.0	10.646
13	7 45 22.67	2.0314	19 0 32.6	7.667	13	9 18 52.97	1.8795	11 33 29.8	10.694
14	7 47 24.44	2.0275	18 52 50.2	7.747	14	9 20 45.68	1.8774	11 22 46.7	10.742
15	7 49 25.97	2.0236	18 45 3.0	7.826	15	9 22 38.26	1.8753	11 12 0.8	10.788
16	7 51 27.27	2.0197	18 37 11.1	7.904	16	9 24 30.72	1.8734	11 1 12.2	10.833
17	7 53 28.33	2.0158	18 29 14.5	7.982	17	9 26 23.07	1.8715	10 50 20.9	10.878
18	7 55 29.17	2.0120	18 21 13.3	8.058	18	9 28 15.30	1.8696	10 39 26.9	10.922
19	7 57 29.77	2.0081	18 13 7.5	8.135	19	9 30 7.42	1.8678	10 28 30.3	10.965
20	7 59 30.14	2.0043	18 4 57.1	8.210	20	9 31 59.44	1.8661	10 17 31.1	11.008
21	8 1 30.29	2.0006	17 56 42.3	8.284	21	9 33 51.35	1.8643	10 6 29.3	11.051
22	8 3 30.21	1.9968	17 48 23.0	8.358	22	9 35 43.16	1.8627	9 55 25.0	11.093
23	8 5 29.90	1.9931	17 39 59.3	8.432	23	9 37 34.87	1.8611	9 44 18.2	11.134
24	8 7 29.38	1.9894	N.17 31 31.2	8.504	24	9 39 26.49	1.8596	N. 9 33 8.9	11.174

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 17.					FRIDAY 19.				
0	h m s		° ' "		0	h m s		° ' "	
1	9 39 26.49	1.8596	N. 9 33 8.9	11.174	1	11 8 5.35	1.8586	N. 0 1 35.1	12.403
2	9 41 18.02	1.8581	9 21 57.3	11.213	2	11 9 56.91	1.8602	S. 0 10 49.4	12.413
3	9 43 9.46	1.8567	9 10 43.3	11.253	3	11 11 48.57	1.8618	0 23 14.5	12.423
4	9 45 0.82	1.8553	8 59 26.9	11.292	4	11 13 40.33	1.8636	0 35 40.2	12.433
5	9 46 52.10	1.8540	8 48 8.2	11.330	5	11 15 32.20	1.8654	0 48 6.4	12.440
6	9 48 43.30	1.8528	8 36 47.3	11.368	6	11 17 24.18	1.8673	1 0 33.0	12.447
7	9 50 34.43	1.8516	8 25 24.1	11.405	7	11 19 16.27	1.8691	1 13 0.0	12.453
8	9 52 25.49	1.8505	8 13 58.7	11.441	8	11 21 8.47	1.8711	1 25 27.4	12.459
9	9 54 16.49	1.8494	8 2 31.2	11.477	9	11 23 0.80	1.8733	1 37 55.1	12.464
10	9 56 7.42	1.8484	7 51 1.5	11.512	10	11 24 53.26	1.8753	1 50 23.1	12.469
11	9 57 58.30	1.8475	7 39 29.8	11.546	11	11 26 45.84	1.8775	2 2 51.4	12.473
12	9 59 49.12	1.8465	7 27 56.0	11.581	12	11 28 38.56	1.8798	2 15 19.8	12.476
13	10 1 39.88	1.8457	7 16 20.1	11.614	13	11 30 31.42	1.8822	2 27 48.5	12.478
14	10 3 30.60	1.8450	7 4 42.3	11.646	14	11 32 24.42	1.8846	2 40 17.2	12.479
15	10 5 21.28	1.8443	6 53 2.6	11.678	15	11 34 17.57	1.8870	2 52 46.0	12.480
16	10 7 11.91	1.8436	6 41 20.9	11.710	16	11 36 10.86	1.8895	3 5 14.8	12.480
17	10 9 2.51	1.8431	6 29 37.4	11.741	17	11 38 4.31	1.8922	3 17 43.6	12.479
18	10 10 53.08	1.8426	6 17 52.0	11.772	18	11 39 57.93	1.8949	3 30 12.3	12.478
19	10 12 43.62	1.8421	6 6 4.8	11.801	19	11 41 51.70	1.8976	3 42 40.9	12.475
20	10 14 34.13	1.8417	5 54 15.9	11.830	20	11 43 45.64	1.9004	3 55 9.3	12.471
21	10 16 24.62	1.8414	5 42 25.2	11.859	21	11 45 39.75	1.9033	4 7 37.4	12.467
22	10 18 15.10	1.8412	5 30 32.8	11.887	22	11 47 34.04	1.9063	4 20 5.3	12.463
23	10 20 5.56	1.8409	5 18 38.8	11.913	23	11 49 28.51	1.9093	4 32 32.9	12.457
24	10 21 56.01	1.8408	N. 5 6 43.2	11.940	24	11 51 23.16	1.9124	S. 4 45 0.1	12.450
THURSDAY 18.					SATURDAY 20.				
0	10 23 46.45	1.8407	N. 4 54 46.0	11.966	0	11 53 18.00	1.9156	S. 4 57 26.9	12.442
1	10 25 36.89	1.8407	4 42 47.3	11.992	1	11 55 13.03	1.9188	5 9 53.2	12.434
2	10 27 27.33	1.8408	4 30 47.0	12.017	2	11 57 8.26	1.9222	5 22 19.0	12.426
3	10 29 17.78	1.8409	4 18 45.3	12.041	3	11 59 3.69	1.9255	5 34 44.3	12.416
4	10 31 8.24	1.8411	4 6 42.1	12.065	4	12 0 59.32	1.9290	5 47 8.9	12.404
5	10 32 58.71	1.8413	3 54 37.5	12.088	5	12 2 55.17	1.9325	5 59 32.8	12.393
6	10 34 49.20	1.8417	3 42 31.6	12.110	6	12 4 51.22	1.9360	6 11 56.0	12.380
7	10 36 39.71	1.8420	3 30 24.3	12.132	7	12 6 47.49	1.9397	6 24 18.4	12.367
8	10 38 30.24	1.8424	3 18 15.8	12.153	8	12 8 43.98	1.9434	6 36 40.0	12.353
9	10 40 20.80	1.8429	3 6 6.0	12.173	9	12 10 40.70	1.9473	6 49 0.7	12.337
10	10 42 11.39	1.8435	2 53 55.0	12.193	10	12 12 37.65	1.9511	7 1 20.4	12.320
11	10 44 2.02	1.8442	2 41 42.8	12.213	11	12 14 34.83	1.9550	7 13 39.1	12.303
12	10 45 52.69	1.8449	2 29 29.5	12.231	12	12 16 32.25	1.9590	7 25 56.8	12.286
13	10 47 43.41	1.8457	2 17 15.1	12.249	13	12 18 29.91	1.9631	7 38 13.4	12.266
14	10 49 34.17	1.8465	2 4 59.6	12.267	14	12 20 27.82	1.9672	7 50 28.7	12.245
15	10 51 24.99	1.8474	1 52 43.1	12.283	15	12 22 25.98	1.9713	8 2 42.8	12.225
16	10 53 15.86	1.8483	1 40 25.6	12.299	16	12 24 24.38	1.9756	8 14 55.7	12.204
17	10 55 6.79	1.8494	1 28 7.2	12.315	17	12 26 23.05	1.9800	8 27 7.3	12.181
18	10 56 57.79	1.8505	1 15 47.8	12.330	18	12 28 21.98	1.9843	8 39 17.4	12.156
19	10 58 48.85	1.8517	1 3 27.6	12.343	19	12 30 21.17	1.9888	8 51 26.0	12.131
20	11 0 39.99	1.8529	0 51 6.6	12.357	20	12 32 20.63	1.9933	9 3 33.1	12.105
21	11 2 31.20	1.8543	0 38 44.8	12.370	21	12 34 20.36	1.9978	9 15 38.6	12.078
22	11 4 22.50	1.8557	0 26 22.2	12.383	22	12 36 20.37	2.0025	9 27 42.5	12.051
23	11 6 13.88	1.8571	0 13 58.9	12.393	23	12 38 20.66	2.0072	9 39 44.7	12.022
24	11 8 5.35	1.8586	N. 0 1 35.1	12.403	24	12 40 21.23	2.0119	S. 9 51 45.1	11.991

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 21.					TUESDAY 23.				
0	12 40 21.23	2.0119	S. 9 51 45.1	11.991	0	14 23 27.63	2.2999	S. 18 29 40.2	9.082
1	12 42 22.09	2.0168	10 3 43.6	11.959	1	14 25 45.83	2.3067	18 38 42.3	8.987
2	12 44 23.25	2.0218	10 15 40.2	11.927	2	14 28 4.43	2.3133	18 47 38.6	8.891
3	12 46 24.70	2.0267	10 27 34.8	11.893	3	14 30 23.43	2.3200	18 56 29.2	8.793
4	12 48 26.45	2.0317	10 39 27.4	11.858	4	14 32 42.83	2.3268	19 5 13.8	8.693
5	12 50 28.50	2.0368	10 51 17.8	11.823	5	14 35 2.64	2.3335	19 13 52.4	8.593
6	12 52 30.86	2.0419	11 3 6.1	11.787	6	14 37 22.85	2.3402	19 22 25.0	8.492
7	12 54 33.53	2.0472	11 14 52.2	11.748	7	14 39 43.46	2.3468	19 30 51.4	8.388
8	12 56 36.52	2.0524	11 26 35.9	11.709	8	14 42 4.47	2.3534	19 39 11.5	8.283
9	12 58 39.82	2.0578	11 38 17.3	11.669	9	14 44 25.87	2.3601	19 47 25.3	8.177
10	13 0 43.45	2.0632	11 49 56.2	11.628	10	14 46 47.68	2.3668	19 55 32.7	8.068
11	13 2 47.40	2.0685	12 1 32.6	11.584	11	14 49 9.88	2.3733	20 3 33.5	7.958
12	13 4 51.67	2.0740	12 13 6.3	11.540	12	14 51 32.48	2.3800	20 11 27.6	7.847
13	13 6 56.28	2.0796	12 24 37.4	11.496	13	14 53 55.48	2.3865	20 19 15.1	7.734
14	13 9 1.22	2.0852	12 36 5.8	11.449	14	14 56 18.86	2.3930	20 26 55.7	7.620
15	13 11 6.50	2.0908	12 47 31.3	11.401	15	14 58 42.64	2.3996	20 34 29.5	7.505
16	13 13 12.12	2.0966	12 58 53.9	11.353	16	15 1 6.81	2.4060	20 41 56.3	7.388
17	13 15 18.09	2.1023	13 10 13.6	11.303	17	15 3 31.36	2.4124	20 49 16.1	7.270
18	13 17 24.40	2.1082	13 21 30.3	11.252	18	15 5 56.30	2.4188	20 56 28.7	7.149
19	13 19 31.07	2.1141	13 32 43.8	11.199	19	15 8 21.62	2.4252	21 3 34.0	7.028
20	13 21 38.09	2.1199	13 43 54.2	11.146	20	15 10 47.32	2.4314	21 10 32.1	6.906
21	13 23 45.46	2.1258	13 55 1.3	11.091	21	15 13 13.39	2.4377	21 17 22.7	6.782
22	13 25 53.19	2.1318	14 6 5.1	11.034	22	15 15 39.84	2.4439	21 24 5.9	6.657
23	13 28 1.28	2.1379	S. 14 17 5.4	10.976	23	15 18 6.66	2.4501	S. 21 30 41.5	6.529
MONDAY 22.					WEDNESDAY 24.				
0	13 30 9.74	2.1440	S. 14 28 2.2	10.917	0	15 20 33.85	2.4562	S. 21 37 9.4	6.401
1	13 32 18.56	2.1502	14 38 55.4	10.857	1	15 23 1.40	2.4622	21 43 29.6	6.271
2	13 34 27.76	2.1564	14 49 45.0	10.795	2	15 25 29.31	2.4681	21 49 41.9	6.139
3	13 36 37.33	2.1626	15 0 30.8	10.733	3	15 27 57.57	2.4740	21 55 46.3	6.007
4	13 38 47.27	2.1688	15 11 12.9	10.668	4	15 30 26.19	2.4798	22 1 42.7	5.873
5	13 40 57.58	2.1751	15 21 51.0	10.602	5	15 32 55.15	2.4856	22 7 31.1	5.738
6	13 43 8.28	2.1815	15 32 25.1	10.534	6	15 35 24.46	2.4913	22 13 11.3	5.602
7	13 45 19.36	2.1878	15 42 55.1	10.466	7	15 37 54.10	2.4968	22 18 43.3	5.463
8	13 47 30.82	2.1943	15 53 21.0	10.396	8	15 40 24.08	2.5024	22 24 6.9	5.324
9	13 49 42.67	2.2007	16 3 42.6	10.325	9	15 42 54.39	2.5078	22 29 22.2	5.184
10	13 51 54.90	2.2071	16 14 0.0	10.253	10	15 45 25.02	2.5132	22 34 29.0	5.043
11	13 54 7.52	2.2136	16 24 12.9	10.178	11	15 47 55.97	2.5185	22 39 27.3	4.901
12	13 56 20.53	2.2202	16 34 21.3	10.102	12	15 50 27.24	2.5237	22 44 17.1	4.757
13	13 58 33.94	2.2268	16 44 25.1	10.025	13	15 52 58.81	2.5288	22 48 58.1	4.611
14	14 0 47.74	2.2333	16 54 24.3	9.947	14	15 55 30.69	2.5338	22 53 30.4	4.464
15	14 3 1.93	2.2398	17 4 18.7	9.867	15	15 58 2.86	2.5387	22 57 53.8	4.317
16	14 5 16.52	2.2465	17 14 8.3	9.785	16	16 0 35.33	2.5435	23 2 8.4	4.168
17	14 7 31.51	2.2532	17 23 52.9	9.702	17	16 3 8.08	2.5482	23 6 14.0	4.018
18	14 9 46.90	2.2598	17 33 32.5	9.618	18	16 5 41.11	2.5528	23 10 10.6	3.868
19	14 12 2.69	2.2664	17 43 7.1	9.533	19	16 8 14.41	2.5573	23 13 58.1	3.715
20	14 14 18.87	2.2731	17 52 36.5	9.445	20	16 10 47.98	2.5616	23 17 36.4	3.563
21	14 16 35.46	2.2798	18 2 0.5	9.356	21	16 13 21.80	2.5658	23 21 5.6	3.409
22	14 18 52.45	2.2865	18 11 19.2	9.267	22	16 15 55.88	2.5701	23 24 25.5	3.254
23	14 21 9.84	2.2932	18 20 32.5	9.175	23	16 18 30.21	2.5741	23 27 36.1	3.099
24	14 23 27.63	2.2999	S. 18 29 40.2	9.082	24	16 21 4.77	2.5779	S. 23 30 37.4	2.943

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 25.					SATURDAY 27.				
0	h m s	a	° ' "	"	0	h m s	a	° ' "	"
1	16 21 4.77	2.5779	S. 23 30 37.4	2.943	1	18 26 44.04	2.6034	S. 22 42 7.0	4.978
2	16 23 39.56	2.5817	23 33 29.2	2.784	2	18 29 20.16	2.6006	22 37 3.6	5.137
3	16 26 14.58	2.5854	23 36 11.5	2.626	3	18 31 56.11	2.5976	22 31 50.6	5.294
4	16 28 49.81	2.5889	23 38 44.3	2.467	4	18 34 31.87	2.5945	22 26 28.3	5.450
5	16 31 25.25	2.5923	23 41 7.5	2.307	5	18 37 7.45	2.5914	22 20 56.6	5.607
6	16 34 0.89	2.5957	23 43 21.1	2.146	6	18 39 42.84	2.5882	22 15 15.5	5.762
7	16 36 36.73	2.5988	23 45 25.0	1.984	7	18 42 18.03	2.5848	22 9 25.2	5.915
8	16 39 12.75	2.6018	23 47 19.2	1.823	8	18 44 53.02	2.5814	22 3 25.7	6.068
9	16 41 48.95	2.6047	23 49 3.7	1.660	9	18 47 27.80	2.5778	21 57 17.1	6.219
10	16 44 25.31	2.6074	23 50 38.4	1.496	10	18 50 2.36	2.5741	21 50 59.4	6.370
11	16 47 1.84	2.6101	23 52 3.2	1.332	11	18 52 36.69	2.5703	21 44 32.7	6.520
12	16 49 38.52	2.6125	23 53 18.2	1.168	12	18 55 10.80	2.5665	21 37 57.0	6.668
13	16 52 15.34	2.6148	23 54 23.3	1.003	13	18 57 44.67	2.5626	21 31 12.5	6.816
14	16 54 52.30	2.6171	23 55 18.5	0.837	14	19 0 18.31	2.5586	21 24 19.1	6.963
15	16 57 29.39	2.6191	23 56 3.7	0.670	15	19 2 51.70	2.5544	21 17 17.0	7.107
16	17 0 6.59	2.6209	23 56 38.9	0.504	16	19 5 24.84	2.5503	21 10 6.3	7.251
17	17 2 43.90	2.6227	23 57 4.2	0.338	17	19 7 57.73	2.5460	21 2 46.9	7.394
18	17 5 21.32	2.6244	23 57 19.4	0.170	18	19 10 30.36	2.5417	20 55 19.0	7.536
19	17 7 58.83	2.6258	23 57 24.6	-0.002	19	19 13 2.73	2.5373	20 47 42.6	7.676
20	17 10 36.42	2.6272	23 57 19.7	+0.166	20	19 15 34.83	2.5328	20 39 57.9	7.814
21	17 13 14.09	2.6283	23 57 4.7	0.333	21	19 18 6.66	2.5282	20 32 4.9	7.952
22	17 15 51.82	2.6294	23 56 39.7	0.501	22	19 20 38.21	2.5236	20 24 3.7	8.088
23	17 18 29.62	2.6303	23 56 4.6	0.669	23	19 23 9.49	2.5189	20 15 54.3	8.223
24	17 21 7.46	2.6310	S. 23 55 19.4	0.838	24	19 25 40.48	2.5141	S. 20 7 36.9	8.358
FRIDAY 26.					SUNDAY 28.				
0	h m s	a	° ' "	"	0	h m s	a	° ' "	"
1	17 23 45.34	2.6316	S. 23 54 24.0	1.007	1	19 28 11.18	2.5093	S. 19 59 11.4	8.490
2	17 26 23.25	2.6321	23 53 18.5	1.175	2	19 30 41.60	2.5045	19 50 38.1	8.620
3	17 29 1.19	2.6324	23 52 3.0	1.343	3	19 33 11.72	2.4996	19 41 57.0	8.749
4	17 31 39.14	2.6325	23 50 37.3	1.513	4	19 35 41.55	2.4947	19 33 8.2	8.877
5	17 34 17.09	2.6325	23 49 1.5	1.681	5	19 38 11.08	2.4897	19 24 11.8	9.003
6	17 36 55.04	2.6323	23 47 15.6	1.850	6	19 40 40.31	2.4847	19 15 7.8	9.128
7	17 39 32.97	2.6320	23 45 19.5	2.018	7	19 43 9.24	2.4797	19 5 56.4	9.252
8	17 42 10.88	2.6317	23 43 13.4	2.185	8	19 45 37.87	2.4746	18 56 37.6	9.374
9	17 44 48.77	2.6311	23 40 57.3	2.353	9	19 48 6.19	2.4694	18 47 11.5	9.495
10	17 47 26.61	2.6303	23 38 31.0	2.522	10	19 50 34.20	2.4643	18 37 38.2	9.613
11	17 50 4.41	2.6296	23 35 54.7	2.688	11	19 53 1.90	2.4591	18 27 57.9	9.731
12	17 52 42.16	2.6286	23 33 8.4	2.855	12	19 55 29.29	2.4539	18 18 10.5	9.848
13	17 55 19.84	2.6274	23 30 12.1	3.022	13	19 57 56.37	2.4487	18 8 16.1	9.963
14	17 57 57.45	2.6261	23 27 5.8	3.188	14	20 0 23.13	2.4433	17 58 15.0	10.075
15	18 0 34.97	2.6247	23 23 49.6	3.353	15	20 2 49.57	2.4379	17 48 7.1	10.187
16	18 3 12.41	2.6232	23 20 23.4	3.518	16	20 5 15.70	2.4328	17 37 52.6	10.296
17	18 5 49.75	2.6215	23 16 47.4	3.683	17	20 7 41.51	2.4275	17 27 31.6	10.404
18	18 8 26.99	2.6197	23 13 1.5	3.848	18	20 10 7.00	2.4222	17 17 4.1	10.511
19	18 11 4.11	2.6177	23 9 5.7	4.011	19	20 12 32.17	2.4168	17 6 30.3	10.616
20	18 13 41.11	2.6156	23 5 0.2	4.173	20	20 14 57.02	2.4116	16 55 50.2	10.720
21	18 16 17.98	2.6134	23 0 44.9	4.336	21	20 17 21.56	2.4063	16 45 3.9	10.823
22	18 18 54.72	2.6111	22 56 19.9	4.498	22	20 19 45.78	2.4010	16 34 11.5	10.923
23	18 21 31.31	2.6086	22 51 45.2	4.658	23	20 22 9.68	2.3957	16 23 13.2	11.022
24	18 24 7.75	2.6061	22 47 0.9	4.818	24	20 24 33.26	2.3903	16 12 8.9	11.119
	18 26 44.04	2.6034	S. 22 42 7.0	4.978		20 26 56.52	2.3850	S. 16 0 58.9	11.214

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 29.					WEDNESDAY 31.				
0	h m s		° ' "		0	h m s		° ' "	
1	20 26 56.52	2.3850	S. 16 0 58.9	11.214	1	22 15 53.82	2.1731	S. 5 42 15.5	13.980
2	20 29 19.46	2.3798	15 49 43.2	11.309	2	22 18 4.11	2.1700	5 28 16.0	14.002
3	20 31 42.09	2.3745	15 38 21.8	11.402	3	22 20 14.22	2.1671	5 14 15.3	14.022
4	20 34 4.40	2.3692	15 26 55.0	11.493	4	22 22 24.16	2.1643	5 0 13.4	14.040
5	20 36 26.39	2.3639	15 15 22.7	11.583	5	22 24 33.93	2.1614	4 46 10.5	14.058
6	20 38 48.07	2.3588	15 3 45.1	11.670	6	22 26 43.53	2.1587	4 32 6.5	14.074
7	20 41 9.44	2.3536	14 52 2.3	11.756	7	22 28 52.97	2.1560	4 18 1.6	14.088
8	20 43 30.50	2.3483	14 40 14.4	11.840	8	22 31 2.25	2.1535	4 3 55.9	14.102
9	20 45 51.24	2.3432	14 28 21.5	11.923	9	22 33 11.37	2.1508	3 49 49.3	14.115
10	20 48 11.68	2.3381	14 16 23.6	12.005	10	22 35 20.34	2.1483	3 35 42.1	14.125
11	20 50 31.81	2.3329	14 4 20.9	12.085	11	22 37 29.17	2.1459	3 21 34.3	14.134
12	20 52 51.63	2.3278	13 52 13.4	12.164	12	22 39 37.85	2.1436	3 7 26.0	14.143
13	20 55 11.14	2.3228	13 40 1.2	12.240	13	22 41 46.40	2.1413	2 53 17.2	14.149
14	20 57 30.36	2.3178	13 27 44.6	12.314	14	22 43 54.81	2.1391	2 39 8.1	14.155
15	20 59 49.27	2.3128	13 15 23.5	12.388	15	22 46 3.09	2.1370	2 24 58.6	14.159
16	21 2 7.89	2.3078	13 2 58.0	12.461	16	22 48 11.25	2.1349	2 10 49.0	14.162
17	21 4 26.21	2.3029	12 50 28.2	12.531	17	22 50 19.28	2.1329	1 56 39.2	14.164
18	21 6 44.24	2.2980	12 37 54.3	12.599	18	22 52 27.20	2.1310	1 42 29.3	14.164
19	21 9 1.97	2.2932	12 25 16.3	12.666	19	22 54 35.00	2.1292	1 28 19.5	14.163
20	21 11 19.42	2.2885	12 12 34.4	12.732	20	22 56 42.70	2.1274	1 14 9.7	14.162
21	21 13 36.59	2.2838	11 59 48.5	12.796	21	22 58 50.29	2.1257	1 0 0.1	14.158
22	21 15 53.47	2.2790	11 46 58.9	12.858	22	23 0 57.78	2.1240	0 45 50.7	14.154
23	21 18 10.07	2.2743	11 34 5.5	12.919	23	23 3 5.17	2.1224	0 31 41.6	14.148
24	21 20 26.39	2.2698	S. 11 21 8.6	12.978	23	23 5 12.47	2.1209	S. 0 17 32.9	14.141
TUESDAY 30.					THURSDAY, JUNE 1.				
0	21 22 42.44	2.2653	S. 11 8 8.1	13.037	0	23 7 19.68	2.1195	S. 0 3 24.7	14.133
1	21 24 58.22	2.2607	10 55 4.2	13.093	PHASES OF THE MOON.				
2	21 27 13.72	2.2562	10 41 57.0	13.148					
3	21 29 28.96	2.2518	10 28 46.5	13.201					
4	21 31 43.94	2.2475	10 15 32.9	13.253					
5	21 33 58.66	2.2432	10 2 16.2	13.303					
6	21 36 13.12	2.2390	9 48 56.5	13.352					
7	21 38 27.34	2.2348	9 35 34.0	13.398					
8	21 40 41.30	2.2307	9 22 8.7	13.444					
9	21 42 55.02	2.2266	9 8 40.7	13.489					
10	21 45 8.49	2.2226	8 55 10.0	13.532					
11	21 47 21.73	2.2187	8 41 36.9	13.573					
12	21 49 34.73	2.2148	8 28 1.3	13.613					
13	21 51 47.50	2.2110	8 14 23.4	13.652					
14	21 54 0.05	2.2073	8 0 43.1	13.689					
15	21 56 12.37	2.2035	7 47 0.7	13.723					
16	21 58 24.47	2.1998	7 33 16.3	13.758					
17	22 0 36.35	2.1963	7 19 29.8	13.791					
18	22 2 48.02	2.1928	7 5 41.4	13.822					
19	22 4 59.49	2.1894	6 51 51.2	13.852					
20	22 7 10.75	2.1860	6 37 59.2	13.881					
21	22 9 21.81	2.1827	6 24 5.5	13.908					
22	22 11 32.67	2.1794	6 10 10.3	13.933					
23	22 13 43.34	2.1763	5 56 13.6	13.957					
24	22 15 53.82	2.1731	S. 5 42 15.5	13.980					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	JUPITER W.	79 51 18	2266	81 38 7	2266	83 24 57	2266	85 11 46	2266
	Antares W.	46 35 2	2291	48 21 15	2291	50 7 28	2290	51 53 42	2291
	SATURN W.	31 29 13	2280	33 15 42	2279	35 2 12	2279	36 48 43	2278
	α Pegasi E.	58 49 55	2476	57 8 8	2484	55 26 32	2493	53 45 9	2508
	VENUS E.	70 56 18	2700	69 19 38	2701	67 43 0	2702	66 6 23	2703
	SUN E.	106 21 11	2602	104 42 19	2601	103 3 26	2601	101 24 33	2601
2	JUPITER W.	94 5 40	2271	95 52 22	2272	97 39 3	2273	99 25 42	2275
	Antares W.	60 44 43	2294	62 30 52	2294	64 17 0	2296	66 3 6	2296
	SATURN W.	45 41 21	2279	47 27 51	2281	49 14 19	2281	51 0 46	2282
	VENUS E.	58 3 50	2714	56 27 29	2717	54 51 12	2720	53 14 59	2724
	SUN E.	93 10 16	2605	91 31 28	2607	89 52 42	2607	88 13 57	2610
3	Antares W.	74 53 5	2305	76 38 57	2307	78 24 46	2310	80 10 31	2312
	SATURN W.	59 52 32	2291	61 38 45	2292	63 24 56	2294	65 11 4	2296
	VENUS E.	45 15 18	2748	43 39 42	2754	42 4 14	2761	40 28 55	2769
	SUN E.	80 0 49	2619	78 22 21	2621	76 43 54	2624	75 5 31	2626
4	Antares W.	88 58 21	2326	90 43 42	2329	92 28 59	2333	94 14 10	2337
	SATURN W.	74 0 50	2311	75 46 34	2313	77 32 14	2317	79 17 49	2320
	α Aquilæ W.	42 26 22	3548	43 45 53	3473	45 6 47	3408	46 28 55	3350
	SUN E.	66 54 36	2642	65 16 38	2646	63 38 46	2650	62 0 59	2654
5	SATURN W.	88 4 23	2340	89 49 24	2345	91 34 18	2349	93 19 6	2354
	α Aquilæ W.	53 34 4	3143	55 1 22	3114	56 29 14	3089	57 57 37	3066
	SUN E.	53 53 30	2678	52 16 20	2683	50 39 17	2689	49 2 22	2694
6	α Aquilæ W.	65 25 24	2991	66 55 48	2981	68 26 24	2974	69 57 9	2969
	Fomalhaut W.	41 19 6	3574	42 38 9	3502	43 58 31	3441	45 20 1	3388
	SUN E.	40 59 50	2728	39 23 47	2736	37 47 55	2744	36 12 14	2753
7	α Aquilæ W.	77 32 9	2959	79 3 13	2962	80 34 14	2964	82 5 12	2968
	Fomalhaut W.	52 20 36	3203	53 46 42	3178	55 13 18	3157	56 40 19	3138
	SUN E.	28 16 51	2804	26 42 28	2817	25 8 22	2830	23 34 33	2845
11	SUN W.	21 6 6	3179	22 32 40	3185	23 59 7	3192	25 25 26	3200
	MARS E.	59 46 44	2973	58 15 57	2986	56 45 27	2999	55 15 13	3012
	Regulus E.	76 50 3	2796	75 15 30	2808	73 41 12	2819	72 7 9	2831
12	SUN W.	32 34 25	3247	33 59 39	3256	35 24 42	3266	36 49 33	3276
	MARS E.	47 48 6	3078	46 19 29	3091	44 51 8	3104	43 23 3	3118
	Regulus E.	64 20 44	2889	62 48 11	2901	61 15 53	2912	59 43 49	2924
13	SUN W.	43 50 58	3324	45 14 42	3332	46 38 16	3342	48 1 39	3350
	MARS E.	36 6 41	3184	34 40 13	3198	33 14 1	3212	31 48 6	3227
	Regulus E.	52 6 58	2977	50 36 16	2986	49 5 46	2997	47 35 29	3007
	Spica E.	106 5 3	2956	104 33 55	2965	103 2 58	2973	101 32 12	2982
14	SUN W.	54 56 16	3388	56 18 46	3393	57 41 8	3401	59 3 23	3408
	Regulus E.	40 7 7	3054	38 38 1	3064	37 9 7	3073	35 40 24	3082
	Spica E.	94 0 54	3019	92 31 5	3026	91 1 25	3032	89 31 52	3039
	JUPITER E.	104 42 12	2997	103 11 56	3003	101 41 47	3009	100 11 46	3014

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	JUPITER W.	86 58 35	2267	88 45 23	2268	90 32 10	2268	92 18 56	2270
	Antares W.	53 39 55	2291	55 26 8	2291	57 12 21	2291	58 58 33	2293
	SATURN W.	38 35 15	2278	40 21 47	2278	42 8 19	2279	43 54 50	2279
	α Pegasi E.	52 4 0	2515	50 23 7	2527	48 42 32	2541	47 2 16	2558
	VENUS E.	64 29 47	2705	62 53 14	2707	61 16 43	2709	59 40 15	2711
	SUN E.	99 45 40	2602	98 6 48	2602	96 27 56	2603	94 49 5	2604
2	JUPITER W.	101 12 18	2277	102 58 52	2279	104 45 22	2281	106 31 49	2284
	Antares W.	67 49 11	2298	69 35 13	2300	71 21 13	2302	73 7 10	2303
	SATURN W.	52 47 12	2283	54 33 36	2285	56 19 57	2287	58 6 16	2289
	VENUS E.	51 38 51	2729	50 2 49	2732	48 26 52	2738	46 51 2	2742
	SUN E.	86 35 15	2611	84 56 35	2612	83 17 57	2614	81 39 21	2617
3	Antares W.	81 56 13	2315	83 41 51	2317	85 27 25	2320	87 12 55	2323
	SATURN W.	66 57 9	2299	68 43 10	2301	70 29 8	2304	72 15 1	2307
	VENUS E.	38 53 46	2777	37 18 48	2786	35 44 2	2797	34 9 30	2808
	SUN E.	73 27 12	2629	71 48 56	2632	70 10 45	2635	68 32 38	2639
4	Antares W.	95 59 16	2341	97 44 16	2344	99 29 11	2348	101 14 0	2353
	SATURN W.	81 3 19	2324	82 48 44	2328	84 34 3	2332	86 19 16	2336
	α Aquilæ W.	47 52 9	2298	49 16 23	2303	50 41 30	2312	52 7 25	2317
	SUN E.	60 23 17	2658	58 45 41	2663	57 8 11	2667	55 30 47	2672
5	SATURN W.	95 3 47	2359	96 48 20	2364	98 32 46	2370	100 17 4	2375
	α Aquilæ W.	59 26 28	2047	60 55 43	2039	62 25 19	2015	63 55 13	2001
	SUN E.	47 25 34	2701	45 48 55	2707	44 12 24	2713	42 36 2	2721
6	α Aquilæ W.	71 28 1	2964	72 58 59	2961	74 30 1	2959	76 1 5	2959
	Fomalhaut W.	46 42 31	3541	48 5 55	3599	49 30 8	3653	50 55 3	3711
	SUN E.	34 36 44	2762	33 1 26	2772	31 26 21	2782	29 51 29	2792
7	α Aquilæ W.	83 36 5	2973	85 6 51	2979	86 37 30	2986	88 8 0	2994
	Fomalhaut W.	58 7 43	3123	59 35 25	3109	61 3 24	3098	62 31 36	3090
	SUN E.	22 1 4	2862	20 27 56	2880	18 55 12	2901	17 22 55	2925
11	SUN W.	26 51 35	3209	28 17 34	3218	29 43 22	3227	31 8 59	3236
	MARS E.	53 45 15	3025	52 15 33	3039	50 46 8	3052	49 16 59	3065
	Regulus E.	70 33 22	2843	68 59 50	2855	67 26 33	2866	65 53 31	2878
12	SUN W.	38 14 13	3286	39 38 41	3295	41 2 58	3306	42 27 3	3314
	MARS E.	41 55 15	3131	40 27 43	3143	39 0 26	3157	37 33 25	3171
	Regulus E.	58 12 0	2934	56 40 24	2945	55 9 2	2955	53 37 53	2966
13	SUN W.	49 24 53	3358	50 47 57	3366	52 10 52	3374	53 33 38	3381
	MARS E.	30 22 29	3242	28 57 10	3258	27 32 9	3275	26 7 28	3291
	Regulus E.	46 5 25	3016	44 35 32	3026	43 5 52	3036	41 36 24	3045
	Spica E.	100 1 37	2990	98 31 12	2998	97 0 57	3005	95 30 51	3013
14	SUN W.	60 25 31	3413	61 47 33	3418	63 9 29	3423	64 31 20	3427
	Regulus E.	34 11 52	3091	32 43 32	3101	31 15 23	3110	29 47 26	3120
	Spica E.	88 2 27	3043	86 33 8	3048	85 3 55	3053	83 34 48	3057
	JUPITER E.	98 41 51	3020	97 12 3	3025	95 42 21	3030	94 12 45	3034

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
15	SUN W.	65 53 6	3431	67 14 48	3434	68 36 26	3438	69 58 0	3439
	Spica E.	82 5 46	3061	80 36 49	3065	79 7 56	3067	77 39 6	3070
	JUPITER E.	92 43 14	3037	91 13 47	3041	89 44 25	3043	88 15 6	3047
16	SUN W.	76 45 23	3444	78 6 50	3444	79 28 17	3443	80 49 45	3441
	Pollux W.	22 39 35	3403	24 1 48	3366	25 24 43	3335	26 48 14	3308
	Spica E.	70 15 34	3076	68 46 55	3075	67 18 15	3074	65 49 34	3073
	JUPITER E.	80 49 9	3052	79 20 1	3052	77 50 53	3052	76 21 45	3051
	Antares E.	115 48 37	3075	114 19 57	3075	112 51 17	3073	111 22 35	3073
17	SUN W.	87 37 45	3425	88 59 33	3421	90 21 26	3415	91 43 25	3410
	Pollux W.	33 52 39	3209	35 18 37	3194	36 44 53	3180	38 11 26	3166
	Spica E.	58 25 38	3060	56 56 40	3056	55 27 37	3052	53 58 29	3047
	JUPITER E.	68 55 34	3040	67 26 11	3036	65 56 43	3033	64 27 11	3028
	Antares E.	103 58 30	3059	102 29 30	3054	101 0 24	3050	99 31 13	3044
	SATURN E.	118 13 19	3035	116 43 50	3030	115 14 15	3026	113 44 34	3021
18	SUN W.	98 35 8	3374	99 57 54	3365	101 20 51	3356	102 43 58	3346
	Pollux W.	45 28 12	3101	46 56 20	3089	48 24 43	3077	49 53 21	3065
	Spica E.	46 31 8	3017	45 1 16	3009	43 31 14	3001	42 1 3	2993
	JUPITER E.	56 57 57	3001	55 27 45	2993	53 57 24	2987	52 26 55	2980
	Antares E.	92 3 27	3011	90 33 28	3003	89 3 19	2994	87 32 59	2986
	SATURN E.	106 14 21	2983	104 43 53	2979	103 13 14	2970	101 42 24	2962
19	SUN W.	109 42 29	3292	111 6 50	3279	112 31 26	3266	113 56 17	3253
	Pollux W.	57 20 25	2999	58 50 39	2986	60 21 9	2973	61 51 56	2958
	MARS W.	33 22 36	3173	34 49 17	3158	36 16 16	3143	37 43 34	3127
	Spica E.	34 27 26	2947	32 56 7	2938	31 24 36	2927	29 52 52	2918
	JUPITER E.	44 52 8	2940	43 20 40	2931	41 49 1	2924	40 17 12	2915
	Antares E.	79 58 27	2936	78 26 54	2924	76 55 6	2913	75 23 4	2901
	SATURN E.	94 5 21	2912	92 33 17	2900	91 0 58	2889	89 28 25	2876
20	SUN W.	121 4 28	3183	122 30 57	3168	123 57 44	3153	125 24 49	3138
	Pollux W.	69 30 19	2887	71 2 55	2872	72 35 50	2857	74 9 4	2842
	MARS W.	45 4 52	3047	46 34 6	3031	48 3 40	3015	49 33 34	2999
	Regulus W.	32 27 54	2884	34 0 33	2867	35 33 34	2849	37 6 58	2831
	Antares E.	67 38 55	2837	66 5 15	2823	64 31 17	2809	62 57 1	2795
	SATURN E.	81 41 39	2812	80 7 27	2798	78 32 57	2785	76 58 9	2770
21	Pollux W.	82 0 14	2764	83 35 29	2748	85 11 5	2732	86 47 2	2717
	MARS W.	57 8 11	2916	58 40 9	2899	60 12 29	2882	61 45 11	2866
	Regulus W.	44 59 39	2745	46 35 19	2729	48 11 21	2711	49 47 46	2695
	Antares E.	55 0 56	2721	53 24 44	2706	51 48 12	2691	50 11 20	2675
	SATURN E.	68 59 20	2696	67 22 35	2681	65 45 29	2665	64 8 2	2650
	α Aquilæ E.	107 29 5	3248	106 3 53	3225	104 38 13	3201	103 12 5	3176
22	Pollux W.	94 51 59	2658	96 30 2	2644	98 8 25	2627	99 47 10	2593
	MARS W.	69 34 5	2782	71 8 57	2765	72 44 11	2748	74 19 47	2732
	Regulus W.	57 55 29	2611	59 34 9	2594	61 13 12	2577	62 52 38	2561
	Antares E.	42 1 50	2599	40 22 54	2585	38 43 38	2569	37 4 1	2555
	SATURN E.	55 55 33	2572	54 15 59	2556	52 36 4	2541	50 55 48	2525
	α Aquilæ E.	95 54 58	3078	94 26 21	3059	92 57 21	3042	91 28 0	3026

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## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIth.	P. L. of Diff.	XIXh.	P. L. of Diff.
15	SUN	W.	71 19 32	3441	72 41 2	3443	74 2 30	3444	75 23 57	3445
	Spica	E.	76 10 20	3072	74 41 36	3073	73 12 54	3075	71 44 14	3075
	JUPITER	E.	86 45 51	3048	85 16 38	3050	83 47 27	3052	82 18 18	3052
16	SUN	W.	82 11 15	3439	83 32 47	3436	84 54 23	3433	86 16 2	3430
	Pollux	W.	28 12 16	3284	29 36 46	3262	31 1 42	3243	32 27 0	3225
	Spica	E.	64 20 52	3072	62 52 8	3069	61 23 21	3067	59 54 31	3065
	JUPITER	E.	74 52 35	3050	73 23 24	3047	71 54 10	3046	70 24 54	3043
	Antares	E.	109 53 52	3070	108 25 6	3069	106 56 18	3065	105 27 26	3062
17	SUN	W.	93 5 30	3403	94 27 43	3397	95 50 3	3390	97 12 31	3382
	Pollux	W.	39 38 16	3153	41 5 22	3140	42 32 43	3127	44 0 20	3114
	Spica	E.	52 29 15	3043	50 59 55	3036	49 30 27	3030	48 0 52	3023
	JUPITER	E.	62 57 33	3023	61 27 49	3018	59 57 59	3013	58 28 2	3006
	Antares	E.	98 1 55	3039	96 32 30	3033	95 2 58	3026	93 33 17	3018
	SATURN	E.	112 14 47	3015	110 44 53	3009	109 14 51	3001	107 44 40	2995
18	SUN	W.	104 7 16	3357	105 30 45	3325	106 54 27	3315	108 18 21	3303
	Pollux	W.	51 22 14	3052	52 51 23	3039	54 20 47	3026	55 50 28	3013
	Spica	E.	40 30 42	2985	39 0 10	2976	37 29 27	2966	35 58 32	2958
	JUPITER	E.	50 56 17	2973	49 25 30	2965	47 54 33	2957	46 23 26	2948
	Antares	E.	86 2 29	2977	84 31 47	2967	83 0 53	2958	81 29 47	2946
	SATURN	E.	100 11 24	2953	98 40 12	2943	97 8 48	2933	95 37 11	2923
19	SUN	W.	115 21 23	3241	116 46 44	3226	118 12 22	3213	119 38 16	3198
	Pollux	W.	63 23 1	2944	64 54 24	2931	66 26 4	2916	67 58 2	2901
	MARS	W.	39 11 11	3111	40 39 7	3095	42 7 23	3079	43 35 58	3064
	Spica	E.	28 20 56	2908	26 48 47	2898	25 16 25	2888	23 43 51	2878
	JUPITER	E.	38 45 12	2907	37 13 2	2898	35 40 41	2891	34 8 10	2883
	Antares	E.	73 50 46	2889	72 18 13	2876	70 45 24	2863	69 12 18	2850
	SATURN	E.	87 55 36	2865	86 22 32	2852	84 49 11	2839	83 15 34	2825
20	SUN	W.	126 52 12	3123	128 19 54	3106	129 47 56	3091	131 16 17	3075
	Pollux	W.	75 42 38	2826	77 16 32	2811	78 50 46	2795	80 25 20	2780
	MARS	W.	51 3 48	2982	52 34 23	2966	54 5 18	2950	55 36 34	2933
	Regulus	W.	38 40 45	2814	40 14 55	2797	41 49 27	2779	43 24 22	2763
	Antares	E.	61 22 26	2781	59 47 33	2766	58 12 20	2751	56 36 48	2736
	SATURN	E.	75 23 2	2756	73 47 36	2741	72 11 50	2726	70 35 45	2711
21	Pollux	W.	88 23 19	2701	89 59 58	2686	91 36 57	2669	93 14 18	2655
	MARS	W.	63 18 14	2848	64 51 39	2831	66 25 26	2815	67 59 35	2798
	Regulus	W.	51 24 33	2678	53 1 43	2660	54 39 16	2644	56 17 11	2627
	Antares	E.	48 34 7	2660	46 56 34	2645	45 18 40	2629	43 40 25	2615
	SATURN	E.	62 30 15	2635	60 52 7	2618	59 13 37	2603	57 34 46	2587
	♌ Aquilæ	E.	101 45 30	3157	100 18 29	3136	98 51 3	3115	97 23 12	3096
22	Pollux	W.	101 26 15	2577	103 5 41	2563	104 45 27	2548	106 25 33	2535
	MARS	W.	75 55 45	2715	77 32 5	2699	79 8 46	2684	80 45 48	2667
	Regulus	W.	64 32 26	2545	66 12 37	2530	67 53 9	2514	69 34 3	2498
	Antares	E.	35 24 4	2540	33 43 47	2527	32 3 11	2512	30 22 15	2499
	SATURN	E.	49 15 10	2510	47 34 11	2496	45 52 52	2480	44 11 11	2466
	♌ Aquilæ	E.	89 58 19	3010	88 28 19	2995	86 58 0	2981	85 27 24	2969

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Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	MARS W.	82 23 12	2652	84 0 57	2636	85 39 3	2621	87 17 29	2607
	Regulus W.	71 15 19	2483	72 56 56	2467	74 38 55	2453	76 21 14	2438
	α Aquilæ E.	83 56 32	2957	82 25 25	2946	80 54 4	2936	79 22 31	2927
24	MARS W.	95 34 34	2537	97 14 56	2525	98 55 35	2512	100 36 31	2500
	Regulus W.	84 57 54	2371	86 42 11	2357	88 26 47	2346	90 11 40	2333
	Spica W.	30 54 22	2372	32 38 37	2358	34 23 12	2344	36 8 7	2332
	α Aquilæ E.	71 42 31	2903	70 10 16	2903	68 38 1	2904	67 5 47	2908
	Fomalhaut E.	97 19 41	2815	95 45 32	2799	94 11 3	2785	92 36 16	2773
25	Spica W.	44 57 9	2274	46 43 46	2265	48 30 37	2256	50 17 42	2246
	JUPITER W.	35 40 29	2300	37 26 28	2285	39 12 49	2272	40 59 29	2260
	α Aquilæ E.	59 26 38	2958	57 55 32	2977	56 24 50	2998	54 54 35	3024
	Fomalhaut E.	84 38 36	2725	83 2 29	2719	81 26 15	2715	79 49 55	2712
	α Pegasi E.	104 28 39	2408	102 45 16	2396	101 1 36	2386	99 17 41	2376
26	Spica W.	59 16 11	2210	61 4 23	2204	62 52 44	2199	64 41 13	2194
	JUPITER W.	49 56 48	2214	51 44 55	2206	53 33 13	2200	55 21 41	2194
	Fomalhaut E.	71 47 52	2719	70 11 37	2725	68 35 31	2734	66 59 36	2744
	α Pegasi E.	90 34 56	2338	88 49 52	2333	87 4 41	2328	85 19 23	2324
27	Spica W.	73 45 7	2179	75 34 6	2177	77 23 8	2176	79 12 12	2176
	JUPITER W.	64 25 51	2174	66 14 57	2172	68 4 7	2170	69 53 19	2170
	Antares W.	28 14 44	2193	30 3 22	2190	31 52 5	2186	33 40 53	2184
	Fomalhaut E.	59 4 25	2831	57 30 37	2857	55 57 23	2886	54 24 46	2919
	α Pegasi E.	76 31 52	2317	74 46 18	2319	73 0 46	2320	71 15 16	2323
28	Spica W.	88 17 29	2179	90 6 28	2181	91 55 24	2184	93 44 16	2186
	JUPITER W.	78 59 27	2172	80 48 37	2174	82 37 44	2176	84 26 48	2178
	Antares W.	42 45 18	2184	44 34 10	2185	46 23 0	2187	48 11 47	2189
	SATURN W.	29 14 16	2166	31 3 35	2167	32 52 53	2169	34 42 8	2170
	α Pegasi E.	62 29 10	2350	60 44 23	2358	58 59 48	2367	57 15 26	2376
	VENUS E.	107 0 31	2574	105 21 1	2576	103 41 33	2578	102 2 8	2581
29	Antares W.	57 14 39	2207	59 2 56	2211	60 51 7	2216	62 39 10	2221
	SATURN W.	43 47 30	2186	45 36 19	2190	47 25 1	2195	49 13 36	2200
	α Arietis E.	90 33 25	2222	88 45 30	2227	86 57 43	2232	85 10 3	2238
	VENUS E.	93 46 9	2600	92 7 14	2605	90 28 26	2611	88 49 46	2616
	SUN E.	122 39 32	2502	120 58 21	2506	119 17 16	2511	117 36 18	2517
30	Antares W.	71 37 22	2251	73 24 33	2258	75 11 34	2265	76 58 25	2272
	SATURN W.	58 14 29	2229	60 2 13	2236	61 49 47	2243	63 37 11	2250
	α Arietis E.	76 13 58	2270	74 27 14	2277	72 40 41	2284	70 54 18	2292
	VENUS E.	80 38 28	2649	79 0 40	2657	77 23 3	2665	75 45 36	2673
	SUN E.	109 13 38	2550	107 33 34	2556	105 53 39	2564	104 13 54	2572
31	Antares W.	85 49 58	2310	87 35 43	2317	89 21 17	2326	91 6 39	2334
	SATURN W.	72 31 30	2287	74 17 49	2295	76 3 56	2303	77 49 51	2311
	α Aquilæ W.	40 1 49	3682	41 18 55	3596	42 37 34	3520	43 57 36	3453
	α Arietis E.	62 5 20	2333	60 20 9	2343	58 35 12	2352	56 50 28	2361
	VENUS E.	67 41 7	2716	66 4 48	2725	64 28 41	2734	62 52 46	2744
	SUN E.	95 57 51	2612	94 19 12	2620	92 40 44	2629	91 2 28	2637

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Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	MARS W.	88 56 15	2592	90 35 21	2578	92 14 46	2564	93 54 30	2550
	Regulus W.	78 3 54	2424	79 46 54	2410	81 30 15	2396	83 13 55	2383
	α Aquilæ E.	77 50 47	2920	76 18 53	2913	74 46 51	2909	73 14 43	2905
24	MARS W.	102 17 44	2489	103 59 13	2478	105 40 57	2467	107 22 58	2458
	Regulus W.	91 56 51	2322	93 42 18	2311	95 28 1	2301	97 13 59	2290
	Spica W.	37 53 20	2319	39 38 52	2307	41 24 41	2296	43 10 47	2285
	α Aquilæ E.	65 33 38	2913	64 1 36	2920	62 29 43	2931	60 58 3	2942
	Fomalhaut E.	91 1 13	2761	89 25 54	2750	87 50 20	2740	86 14 33	2732
25	Spica W.	52 5 1	2238	53 52 32	2230	55 40 15	2223	57 28 8	2216
	JUPITER W.	42 46 27	2249	44 33 41	2239	46 21 10	2230	48 8 53	2222
	α Aquilæ E.	53 24 52	3053	51 55 45	3088	50 27 21	3127	48 59 44	3172
	Fomalhaut E.	78 13 31	2710	76 37 5	2710	75 0 38	2711	73 24 13	2714
	α Pegasi E.	97 33 32	2367	95 49 10	2359	94 4 36	2351	92 19 51	2344
26	Spica W.	66 29 49	2190	68 18 31	2186	70 7 19	2184	71 56 11	2181
	JUPITER W.	57 10 17	2189	58 59 1	2184	60 47 52	2180	62 36 49	2177
	Fomalhaut E.	65 23 55	2756	63 48 30	2772	62 13 25	2788	60 38 42	2808
	α Pegasi E.	83 33 59	2322	81 48 31	2320	80 3 0	2317	78 17 26	2317
27	Spica W.	81 1 16	2175	82 50 21	2176	84 39 25	2176	86 28 28	2178
	JUPITER W.	71 42 32	2169	73 31 46	2169	75 21 1	2169	77 10 15	2170
	Antares W.	35 29 44	2183	37 18 37	2182	39 7 31	2182	40 56 25	2183
	Fomalhaut E.	52 52 51	2956	51 21 43	2997	49 51 27	3044	48 22 9	3096
	α Pegasi E.	69 29 50	2326	67 44 29	2331	65 59 14	2336	64 14 7	2343
28	Spica W.	95 33 4	2190	97 21 47	2193	99 10 25	2197	100 58 57	2201
	JUPITER W.	86 15 48	2182	88 4 43	2185	89 53 33	2189	91 42 17	2193
	Antares W.	50 0 31	2192	51 49 11	2195	53 37 46	2199	55 26 15	2202
	SATURN W.	36 31 21	2172	38 20 30	2175	40 9 35	2178	41 58 35	2182
	α Pegasi E.	55 31 20	2390	53 47 31	2403	52 4 1	2418	50 20 52	2435
	VENUS E.	100 22 47	2584	98 43 30	2587	97 4 17	2591	95 25 10	2596
29	Antares W.	64 27 6	2227	66 14 53	2233	68 2 32	2239	69 50 2	2245
	SATURN W.	51 2 3	2206	52 50 22	2211	54 38 33	2217	56 26 35	2223
	α Arietis E.	83 22 32	2243	81 35 9	2250	79 47 56	2256	78 0 52	2263
	VENUS E.	87 11 13	2622	85 32 48	2629	83 54 32	2635	82 16 25	2643
	SUN E.	115 55 29	2523	114 14 48	2529	112 34 15	2536	110 53 52	2543
30	Antares W.	78 45 5	2279	80 31 35	2287	82 17 54	2294	84 4 2	2302
	SATURN W.	65 24 24	2257	67 11 27	2264	68 58 19	2272	70 45 0	2279
	α Arietis E.	69 8 7	2300	67 22 7	2308	65 36 19	2316	63 50 43	2325
	VENUS E.	74 8 20	2681	72 31 15	2689	70 54 21	2698	69 17 38	2707
	SUN E.	102 34 20	2580	100 54 57	2587	99 15 44	2595	97 36 42	2603
31	Antares W.	92 51 49	2342	94 36 47	2350	96 21 33	2359	98 6 7	2367
	SATURN W.	79 35 35	2319	81 21 7	2327	83 6 27	2335	84 51 35	2344
	α Aquilæ W.	45 18 53	3394	46 41 16	3343	48 4 38	3298	49 28 52	3258
	α Arietis E.	55 5 57	2371	53 21 40	2381	51 37 38	2391	49 53 50	2401
	VENUS E.	61 17 4	2753	59 41 34	2763	58 6 17	2772	56 31 13	2782
	SUN E.	89 24 23	2646	87 46 30	2655	86 8 49	2663	84 31 20	2673

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from		Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Added to Apparent Time.				
Thur.	1	<sup>h</sup> 4 <sup>m</sup> 36 <sup>s</sup> 34.53	10.232	N.22 4 3.2	+20.36	15 48.37	68.41	<sup>m</sup> 2 <sup>s</sup> 25.61		0.374	
Frid.	2	4 40 40.31	10.249	22 12 0.3	19.39	15 48.23	68.46	2 16.42		0.391	
Sat.	3	4 44 46.50	10.266	22 19 34.2	18.42	15 48.09	68.51	2 6.81		0.408	
SUN.	4	4 48 53.07	10.281	22 26 44.7	+17.44	15 47.96	68.56	1 56.82		0.424	
Mon.	5	4 53 0.01	10.296	22 33 31.7	16.46	15 47.83	68.61	1 46.47		0.438	
Tues.	6	4 57 7.29	10.310	22 39 54.9	15.47	15 47.71	68.65	1 35.78		0.452	
Wed.	7	5 1 14.89	10.323	22 45 54.3	+14.47	15 47.59	68.69	1 24.76		0.465	
Thur.	8	5 5 22.79	10.335	22 51 29.7	13.47	15 47.48	68.73	1 13.45		0.477	
Frid.	9	5 9 30.96	10.346	22 56 41.1	12.46	15 47.38	68.77	1 1.87		0.488	
Sat.	10	5 13 39.37	10.356	23 1 28.2	+11.45	15 47.28	68.80	0 50.05		0.498	
SUN.	11	5 17 48.01	10.364	23 5 51.0	10.44	15 47.18	68.83	0 38.00		0.506	
Mon.	12	5 21 56.84	10.371	23 9 49.4	9.42	15 47.09	68.86	0 25.76		0.513	
Tues.	13	5 26 5.85	10.378	23 13 23.3	+ 8.40	15 47.00	68.89	0 13.35		0.520	
Wed.	14	5 30 14.99	10.384	23 16 32.7	7.38	15 46.92	68.91	0 0.80		0.526	
Thur.	15	5 34 24.26	10.388	23 19 17.5	6.35	15 46.85	68.93	0 11.88		0.530	
Frid.	16	5 38 33.63	10.391	23 21 37.5	+ 5.32	15 46.78	68.94	0 24.65		0.533	
Sat.	17	5 42 43.07	10.394	23 23 32.9	4.29	15 46.71	68.95	0 37.50		0.536	
SUN.	18	5 46 52.56	10.396	23 25 3.6	3.26	15 46.65	68.96	0 50.40		0.538	
Mon.	19	5 51 2.08	10.397	23 26 9.5	+ 2.23	15 46.59	68.97	1 3.33		0.539	
Tues.	20	5 55 11.61	10.397	23 26 50.7	1.20	15 46.53	68.97	1 16.26		0.539	
Wed.	21	5 59 21.13	10.396	23 27 7.1	+ 0.17	15 46.48	68.97	1 29.19		0.538	
Thur.	22	6 3 30.62	10.394	23 26 58.6	- 0.86	15 46.43	68.96	1 42.09		0.536	
Frid.	23	6 7 40.06	10.392	23 26 25.4	1.90	15 46.39	68.95	1 54.93		0.534	
Sat.	24	6 11 49.42	10.389	23 25 27.5	2.93	15 46.34	68.94	2 7.70		0.531	
SUN.	25	6 15 58.69	10.384	23 24 4.8	- 3.96	15 46.30	68.93	2 20.38		0.526	
Mon.	26	6 20 7.86	10.379	23 22 17.4	4.99	15 46.26	68.91	2 32.96		0.521	
Tues.	27	6 24 16.90	10.373	23 20 5.4	6.01	15 46.23	68.89	2 45.40		0.515	
Wed.	28	6 28 25.78	10.366	23 17 28.7	- 7.04	15 46.20	68.87	2 57.70		0.508	
Thur.	29	6 32 34.50	10.359	23 14 27.4	8.06	15 46.18	68.84	3 9.82		0.501	
Frid.	30	6 36 43.02	10.351	23 11 1.7	9.08	15 46.16	68.81	3 21.75		0.493	
Sat.	31	6 40 51.34	10.342	N.23 7 11.6	-10.09	15 46.14	68.78	3 33.48		0.484	

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.17 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Subtracted from Mean Time.		
Thur.	1	<sup>h</sup> 4 <sup>m</sup> 36 <sup>s</sup> 34.95	10.231	N.22 4 4.1	+20.36	<sup>m</sup> 2 25.59	0.375	<sup>h</sup> 4 39 <sup>m</sup> 0.54
Frid.	2	4 40 40.70	10.248	22 12 1.1	19.39	2 16.40	0.392	4 42 57.10
Sat.	3	4 44 46.86	10.265	22 19 34.9	18.42	2 6.80	0.408	4 46 53.66
SUN.	4	4 48 53.41	10.280	22 26 45.3	+17.44	1 56.81	0.424	4 50 50.21
Mon.	5	4 53 0.32	10.295	22 33 32.2	16.46	1 46.45	0.438	4 54 46.77
Tues.	6	4 57 7.56	10.309	22 39 55.3	15.47	1 35.77	0.452	4 58 43.33
Wed.	7	5 1 15.13	10.322	22 45 54.7	+14.47	1 24.75	0.465	5 2 39.89
Thur.	8	5 5 23.00	10.333	22 51 30.0	13.47	1 13.45	0.477	5 6 36.44
Frid.	9	5 9 31.14	10.344	22 56 41.3	12.46	1 1.86	0.488	5 10 33.00
Sat.	10	5 13 39.52	10.354	23 1 28.4	+11.45	0 50.04	0.497	5 14 29.56
SUN.	11	5 17 48.12	10.363	23 5 51.1	10.44	0 38.00	0.506	5 18 26.12
Mon.	12	5 21 56.92	10.370	23 9 49.4	9.42	0 25.75	0.514	5 22 22.67
Tues.	13	5 26 5.89	10.377	23 13 23.3	+ 8.40	0 13.34	0.521	5 26 19.23
Wed.	14	5 30 15.00	10.382	23 16 32.7	7.38	0 0.79	0.526	5 30 15.79
Thur.	15	5 34 24.23	10.387	23 19 17.5	6.35	0 11.88	0.530	5 34 12.35
Frid.	16	5 38 33.56	10.390	23 21 37.5	+ 5.32	0 24.65	0.534	5 38 8.91
Sat.	17	5 42 42.96	10.393	23 23 32.9	4.29	0 37.50	0.537	5 42 5.46
SUN.	18	5 46 52.42	10.394	23 25 3.6	3.26	0 50.40	0.538	5 46 2.02
Mon.	19	5 51 1.90	10.395	23 26 9.5	+ 2.23	1 3.32	0.539	5 49 58.58
Tues.	20	5 55 11.39	10.395	23 26 50.7	1.20	1 16.25	0.539	5 53 55.14
Wed.	21	5 59 20.88	10.394	23 27 7.1	+ 0.17	1 29.18	0.538	5 57 51.70
Thur.	22	6 3 30.33	10.392	23 26 58.7	- 0.86	1 42.08	0.536	6 1 48.25
Frid.	23	6 7 39.72	10.390	23 26 25.5	1.90	1 54.91	0.533	6 5 44.81
Sat.	24	6 11 49.05	10.387	23 25 27.6	2.93	2 7.68	0.530	6 9 41.37
SUN.	25	6 15 58.29	10.383	23 24 5.0	- 3.96	2 20.36	0.526	6 13 37.93
Mon.	26	6 20 7.42	10.378	23 22 17.6	4.99	2 32.93	0.521	6 17 34.48
Tues.	27	6 24 16.42	10.372	23 20 5.6	6.01	2 45.38	0.515	6 21 31.04
Wed.	28	6 28 25.27	10.365	23 17 29.0	- 7.04	2 57.67	0.509	6 25 27.60
Thur.	29	6 32 33.95	10.358	23 14 27.9	8.06	3 9.79	0.501	6 29 24.16
Frid.	30	6 36 42.44	10.349	23 11 2.2	9.08	3 21.73	0.493	6 33 20.72
Sat.	31	6 40 50.73	10.340	N.23 7 12.2	-10.09	3 33.45	0.484	6 37 17.27
Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.								Diff. for 1 Hour, + 9 <sup>s</sup> .8565. (Table III.)



AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	152	70 44 31.3	43 53.8	143.67	+ 0.42	0.0061971	+27.3	19 17 49.26
2	153	71 41 59.0	41 21.5	143.64	0.45	0.0062617	26.5	19 13 53.35
3	154	72 39 26.3	38 48.5	143.61	0.43	0.0063245	25.7	19 9 57.44
4	155	73 36 52.7	36 14.7	143.58	+ 0.39	0.0063850	+24.8	19 6 1.52
5	156	74 34 18.4	33 40.3	143.55	0.32	0.0064435	23.8	19 2 5.61
6	157	75 31 43.4	31 5.1	143.52	0.23	0.0064994	22.8	18 58 9.70
7	158	76 29 7.7	28 29.2	143.49	+ 0.12	0.0065531	+21.8	18 54 13.79
8	159	77 26 31.2	25 52.5	143.46	— 0.01	0.0066042	20.8	18 50 17.88
9	160	78 23 54.1	23 15.3	143.43	0.14	0.0066528	19.8	18 46 21.96
10	161	79 21 16.0	20 37.0	143.40	— 0.28	0.0066991	+18.8	18 42 26.05
11	162	80 18 37.1	17 57.9	143.36	0.41	0.0067427	17.8	18 38 30.14
12	163	81 15 57.2	15 17.8	143.33	0.52	0.0067839	16.8	18 34 34.23
13	164	82 13 16.6	12 37.1	143.29	— 0.61	0.0068229	+15.8	18 30 38.32
14	165	83 10 35.0	9 55.3	143.25	0.68	0.0068596	14.8	18 26 42.41
15	166	84 7 52.6	7 12.7	143.22	0.72	0.0068940	13.9	18 22 46.49
16	167	85 5 9.4	4 29.3	143.18	— 0.74	0.0069264	+13.1	18 18 50.58
17	168	86 2 25.3	1 45.0	143.14	0.72	0.0069571	12.3	18 14 54.67
18	169	86 59 40.4	59 0.0	143.11	0.66	0.0069858	11.6	18 10 58.76
19	170	87 56 54.8	56 14.2	143.09	— 0.59	0.0070129	+11.0	18 7 2.85
20	171	88 54 8.5	53 27.7	143.06	0.49	0.0070385	10.4	18 3 6.93
21	172	89 51 21.7	50 40.7	143.04	0.37	0.0070625	9.8	17 59 11.02
22	173	90 48 34.4	47 53.2	143.02	— 0.25	0.0070851	+ 9.2	17 55 15.11
23	174	91 45 46.7	45 5.4	143.00	— 0.11	0.0071063	8.5	17 51 19.20
24	175	92 42 58.6	42 17.1	142.99	+ 0.02	0.0071260	7.9	17 47 23.29
25	176	93 40 10.4	39 28.7	142.99	+ 0.14	0.0071443	+ 7.3	17 43 27.38
26	177	94 37 22.0	36 40.1	142.98	0.25	0.0071612	6.7	17 39 31.46
27	178	95 34 33.6	33 51.6	142.98	0.33	0.0071765	6.0	17 35 35.55
28	179	96 31 45.2	31 2.8	142.98	+ 0.39	0.0071901	+ 5.3	17 31 39.64
29	180	97 28 56.9	28 14.5	142.99	0.41	0.0072019	4.5	17 27 43.73
30	181	98 26 8.6	25 26.0	142.99	0.40	0.0072118	3.7	17 23 47.81
31	182	99 23 20.6	22 37.8	143.00	+ 0.37	0.0072198	+ 2.8	17 19 51.90
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, — 9 <sup>h</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 2.3	15 58.4	58 45.2	-1.17	58 30.9	-1.20	19 5.5	2.01	22.8
2	15 54.4	15 50.3	58 16.2	1.23	58 1.2	1.25	19 53.8	2.02	23.8
3	15 46.2	15 42.1	57 46.1	1.26	57 30.9	1.27	20 42.8	2.07	24.8
4	15 38.0	15 33.8	57 15.7	-1.27	57 0.4	-1.27	21 33.3	2.13	25.8
5	15 29.6	15 25.5	56 45.2	1.26	56 30.1	1.25	22 25.1	2.18	26.8
6	15 21.5	15 17.5	56 15.2	1.23	56 0.5	1.21	23 17.9	2.20	27.8
7	15 13.6	15 9.7	55 46.1	-1.18	55 32.1	-1.14	6		28.8
8	15 6.1	15 2.6	55 18.6	1.10	55 5.8	1.03	0 10.6	2.18	0.2
9	14 59.3	14 56.3	54 53.8	0.96	54 42.7	0.87	1 2.1	2.11	1.2
10	14 53.6	14 51.3	54 32.8	-0.77	54 24.3	-0.65	1 51.6	2.01	2.2
11	14 49.4	14 47.9	54 17.2	0.52	54 11.8	0.37	2 38.6	1.90	3.2
12	14 46.9	14 46.5	54 8.2	-0.21	54 6.7	-0.04	3 23.2	1.81	4.2
13	14 46.7	14 47.4	54 7.3	+0.14	54 10.1	+0.34	4 5.8	1.74	5.2
14	14 48.9	14 51.0	54 15.4	0.54	54 23.1	0.74	4 47.1	1.71	6.2
15	14 53.7	14 57.2	54 33.3	0.95	54 45.9	1.16	5 28.1	1.71	7.2
16	15 1.3	15 6.1	55 1.1	+1.36	55 18.6	+1.55	6 9.7	1.76	8.2
17	15 11.5	15 17.4	55 38.4	1.73	56 0.3	1.90	6 53.1	1.86	9.2
18	15 23.9	15 30.7	56 24.0	2.03	56 49.2	2.14	7 39.3	2.00	10.2
19	15 37.9	15 45.3	57 15.5	+2.22	57 42.5	+2.25	8 29.3	2.17	11.2
20	15 52.6	15 59.9	58 9.6	2.24	58 36.3	2.18	9 23.8	2.37	12.2
21	16 6.9	16 13.5	59 2.1	2.07	59 26.1	1.91	10 22.6	2.53	13.2
22	16 19.4	16 24.6	59 48.0	+1.70	60 6.9	+1.44	11 24.5	2.61	14.2
23	16 28.8	16 32.1	60 22.6	1.15	60 34.5	0.83	12 27.2	2.60	15.2
24	16 34.2	16 35.3	60 42.4	+0.48	60 46.2	+0.14	13 28.4	2.49	16.2
25	16 35.1	16 33.9	60 45.7	-0.20	60 41.3	-0.53	14 26.5	2.35	17.2
26	16 31.7	16 28.6	60 33.1	0.82	60 21.6	1.08	15 21.2	2.21	18.2
27	16 24.6	16 20.1	60 7.2	1.30	59 50.4	1.48	16 13.0	2.11	19.2
28	16 15.0	16 9.5	59 31.7	-1.61	59 11.6	-1.70	17 2.7	2.05	20.2
29	16 3.8	15 58.0	58 50.7	1.76	58 29.3	1.78	17 51.6	2.03	21.2
30	15 52.2	15 46.4	58 7.9	1.78	57 46.6	1.75	18 40.6	2.05	22.2
31	15 40.7	15 35.3	57 25.9	-1.70	57 5.8	-1.64	19 30.4	2.10	23.2

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 1.					SATURDAY 3.				
0	23 7 19.68	2.1195	S. 0 3 24.7	14.133	0	0 48 41.60	2.1273	N. 10 43 19.4	22.387
1	23 9 26.81	2.1182	N. 0 10 43.0	14.123	1	0 50 49.28	2.1288	10 55 40.7	22.323
2	23 11 33.86	2.1169	0 24 50.1	14.113	2	0 52 57.06	2.1304	11 7 58.2	22.260
3	23 13 40.84	2.1158	0 38 56.5	14.101	3	0 55 4.93	2.1320	11 20 11.9	22.195
4	23 15 47.75	2.1146	0 53 2.2	14.088	4	0 57 12.90	2.1337	11 32 21.6	22.128
5	23 17 54.59	2.1135	1 7 7.1	14.073	5	0 59 20.97	2.1353	11 44 27.3	22.062
6	23 20 1.37	2.1125	1 21 11.0	14.058	6	1 1 29.14	2.1371	11 56 29.0	21.994
7	23 22 8.09	2.1115	1 35 14.0	14.042	7	1 3 37.42	2.1388	12 8 26.6	21.925
8	23 24 14.75	2.1107	1 49 16.0	14.023	8	1 5 45.80	2.1406	12 20 20.0	21.854
9	23 26 21.37	2.1099	2 3 16.8	14.004	9	1 7 54.29	2.1425	12 32 9.1	21.783
10	23 28 27.94	2.1092	2 17 16.5	13.985	10	1 10 2.90	2.1443	12 43 54.0	21.712
11	23 30 34.47	2.1085	2 31 15.0	13.965	11	1 12 11.61	2.1462	12 55 34.5	21.638
12	23 32 40.96	2.1079	2 45 12.0	13.939	12	1 14 20.44	2.1482	13 7 10.6	21.565
13	23 34 47.42	2.1074	2 59 7.7	13.917	13	1 16 29.39	2.1501	13 18 42.3	21.490
14	23 36 53.85	2.1069	3 13 2.0	13.892	14	1 18 38.45	2.1521	13 30 9.4	21.413
15	23 39 0.25	2.1065	3 26 54.7	13.865	15	1 20 47.64	2.1542	13 41 31.9	21.337
16	23 41 6.63	2.1062	3 40 45.8	13.838	16	1 22 56.95	2.1562	13 52 49.8	21.258
17	23 43 12.99	2.1059	3 54 35.3	13.810	17	1 25 6.38	2.1583	14 4 2.9	21.179
18	23 45 19.34	2.1058	4 8 23.0	13.780	18	1 27 15.94	2.1604	14 15 11.3	21.100
19	23 47 25.68	2.1057	4 22 8.9	13.750	19	1 29 25.63	2.1625	14 26 14.9	21.019
20	23 49 32.02	2.1056	4 35 53.0	13.718	20	1 31 35.44	2.1646	14 37 13.6	20.938
21	23 51 38.35	2.1055	4 49 35.1	13.685	21	1 33 45.38	2.1668	14 48 7.4	20.855
22	23 53 44.68	2.1056	5 3 15.2	13.652	22	1 35 55.46	2.1690	14 58 56.2	20.772
23	23 55 51.02	2.1058	N. 5 16 53.3	13.617	23	1 38 5.66	2.1712	N. 15 9 40.0	20.687
FRIDAY 2.					SUNDAY 4.				
0	23 57 57.37	2.1059	N. 5 30 29.2	13.580	0	1 40 16.00	2.1734	N. 15 20 18.6	20.601
1	0 0 3.73	2.1062	5 44 2.9	13.543	1	1 42 26.47	2.1757	15 30 52.1	20.514
2	0 2 10.11	2.1065	5 57 34.3	13.504	2	1 44 37.08	2.1780	15 41 20.3	20.427
3	0 4 16.51	2.1068	6 11 3.4	13.465	3	1 46 47.83	2.1803	15 51 43.3	20.339
4	0 6 22.93	2.1073	6 24 30.1	13.424	4	1 48 58.71	2.1825	16 2 1.0	20.250
5	0 8 29.39	2.1078	6 37 54.3	13.383	5	1 51 9.73	2.1848	16 12 13.3	20.160
6	0 10 35.87	2.1083	6 51 16.0	13.340	6	1 53 20.88	2.1871	16 22 20.2	20.069
7	0 12 42.38	2.1089	7 4 35.1	13.296	7	1 55 32.18	2.1895	16 32 21.6	19.977
8	0 14 48.94	2.1097	7 17 51.5	13.251	8	1 57 43.62	2.1918	16 42 17.4	19.884
9	0 16 55.54	2.1103	7 31 5.2	13.205	9	1 59 55.19	2.1941	16 52 7.7	19.791
10	0 19 2.18	2.1111	7 44 16.1	13.158	10	2 2 6.91	2.1964	17 1 52.3	19.696
11	0 21 8.87	2.1118	7 57 24.2	13.110	11	2 4 18.76	2.1988	17 11 31.2	19.600
12	0 23 15.60	2.1127	8 10 29.3	13.060	12	2 6 30.76	2.2012	17 21 4.3	19.503
13	0 25 22.39	2.1137	8 23 31.4	13.010	13	2 8 42.90	2.2034	17 30 31.6	19.407
14	0 27 29.24	2.1148	8 36 30.5	12.958	14	2 10 55.17	2.2058	17 39 53.1	19.309
15	0 29 36.16	2.1158	8 49 26.4	12.906	15	2 13 7.59	2.2082	17 49 8.7	19.211
16	0 31 43.13	2.1168	9 2 19.2	12.853	16	2 15 20.15	2.2105	17 58 18.4	19.111
17	0 33 50.18	2.1180	9 15 8.7	12.798	17	2 17 32.85	2.2128	18 7 22.0	19.010
18	0 35 57.29	2.1192	9 27 54.9	12.743	18	2 19 45.68	2.2151	18 16 19.6	18.909
19	0 38 4.48	2.1204	9 40 37.8	12.686	19	2 21 58.66	2.2174	18 25 11.1	18.807
20	0 40 11.74	2.1217	9 53 17.2	12.628	20	2 24 11.77	2.2197	18 33 56.4	18.704
21	0 42 19.08	2.1230	10 5 53.2	12.570	21	2 26 25.02	2.2220	18 42 35.6	18.601
22	0 44 26.50	2.1243	10 18 25.6	12.509	22	2 28 38.41	2.2243	18 51 8.5	18.496
23	0 46 34.00	2.1258	10 30 54.3	12.448	23	2 30 51.93	2.2265	18 59 35.2	18.390
24	0 48 41.60	2.1273	N. 10 43 19.4	12.387	24	2 33 5.59	2.2288	N. 19 7 55.3	18.284

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 5.					WEDNESDAY 7.				
0	h m s		N. 19 7 55.3	8.284	0	h m s		N. 23 31 52.5	2.540
1	2 33 5.59	2.2288	19 16 9.2	8.178	1	4 22 1.06	2.2908	23 34 21.1	2.413
2	2 35 19.38	2.2310	19 24 16.7	8.071	2	4 24 18.50	2.2907	23 36 42.1	2.286
3	2 37 33.31	2.2333	19 32 17.7	7.963	3	4 26 35.94	2.2905	23 38 55.4	2.158
4	2 39 47.37	2.2354	19 40 12.2	7.853	4	4 28 53.36	2.2902	23 41 1.0	2.030
5	2 42 1.56	2.2376	19 48 0.1	7.744	5	4 31 10.76	2.2898	23 42 59.0	1.903
6	2 44 15.88	2.2397	19 55 41.5	7.634	6	4 33 28.14	2.2894	23 44 49.3	1.774
7	2 46 30.32	2.2418	20 3 16.2	7.523	7	4 35 45.49	2.2889	23 46 31.9	1.647
8	2 48 44.89	2.2439	20 10 44.2	7.411	8	4 38 2.81	2.2884	23 48 6.9	1.519
9	2 50 59.59	2.2460	20 18 5.5	7.298	9	4 40 20.10	2.2878	23 49 34.2	1.392
10	2 53 14.41	2.2480	20 25 20.0	7.186	10	4 42 37.34	2.2871	23 50 53.9	1.264
11	2 55 29.35	2.2500	20 32 27.8	7.073	11	4 44 54.55	2.2863	23 52 5.9	1.137
12	2 57 44.41	2.2519	20 39 28.7	6.958	12	4 47 11.70	2.2854	23 53 10.3	1.009
13	2 59 59.58	2.2538	20 46 22.8	6.843	13	4 49 28.80	2.2845	23 54 7.0	0.882
14	3 2 14.87	2.2558	20 53 9.9	6.728	14	4 51 45.84	2.2835	23 54 56.1	0.755
15	3 4 30.28	2.2577	20 59 50.1	6.612	15	4 54 2.82	2.2825	23 55 37.6	0.628
16	3 6 45.80	2.2595	21 6 23.3	6.495	16	4 56 19.74	2.2814	23 56 11.5	0.502
17	3 9 1.42	2.2613	21 12 49.5	6.378	17	4 58 36.59	2.2802	23 56 37.8	0.375
18	3 11 17.15	2.2631	21 19 8.6	6.260	18	5 0 53.36	2.2788	23 56 56.5	0.248
19	3 13 32.99	2.2648	21 25 20.7	6.142	19	5 3 10.05	2.2774	23 57 7.6	+ 0.122
20	3 15 48.93	2.2664	21 31 25.6	6.023	20	5 5 26.65	2.2760	23 57 11.2	- 0.003
21	3 18 4.96	2.2680	21 37 23.4	5.903	21	5 7 43.17	2.2746	23 57 7.3	0.128
22	3 20 21.09	2.2696	21 43 14.0	5.783	22	5 9 59.60	2.2730	23 56 55.8	0.254
23	3 22 37.31	2.2712	N. 21 48 57.4	5.663	23	5 12 15.93	2.2714	N. 23 56 36.8	0.379
24	3 24 53.63	2.2727				5 14 32.17	2.2697		
TUESDAY 6.					THURSDAY 8.				
0	3 27 10.03	2.2741	N. 21 54 33.6	5.543	0	5 16 48.29	2.2678	N. 23 56 10.3	0.504
1	3 29 26.52	2.2754	22 0 2.5	5.421	1	5 19 4.31	2.2660	23 55 36.3	0.628
2	3 31 43.08	2.2768	22 5 24.1	5.299	2	5 21 20.21	2.2641	23 54 54.9	0.752
3	3 33 59.73	2.2781	22 10 38.4	5.178	3	5 23 36.00	2.2621	23 54 6.0	0.876
4	3 36 16.45	2.2793	22 15 45.4	5.055	4	5 25 51.66	2.2600	23 53 9.8	0.999
5	3 38 33.24	2.2804	22 20 45.0	4.932	5	5 28 7.20	2.2580	23 52 6.1	1.122
6	3 40 50.10	2.2815	22 25 37.2	4.808	6	5 30 22.62	2.2558	23 50 55.1	1.245
7	3 43 7.02	2.2826	22 30 22.0	4.685	7	5 32 37.90	2.2535	23 49 36.7	1.367
8	3 45 24.01	2.2836	22 34 59.4	4.561	8	5 34 53.04	2.2512	23 48 11.0	1.489
9	3 47 41.05	2.2845	22 39 29.3	4.436	9	5 37 8.04	2.2488	23 46 38.0	1.611
10	3 49 58.15	2.2854	22 43 51.7	4.312	10	5 39 22.90	2.2464	23 44 57.7	1.733
11	3 52 15.30	2.2862	22 48 6.7	4.187	11	5 41 37.61	2.2439	23 43 10.1	1.853
12	3 54 32.49	2.2869	22 52 14.1	4.061	12	5 43 52.17	2.2413	23 41 15.4	1.972
13	3 56 49.73	2.2877	22 56 14.0	3.936	13	5 46 6.57	2.2388	23 39 13.5	2.092
14	3 59 7.01	2.2883	23 0 6.4	3.810	14	5 48 20.82	2.2361	23 37 4.4	2.211
15	4 1 24.32	2.2888	23 3 51.2	3.684	15	5 50 34.90	2.2333	23 34 48.2	2.329
16	4 3 41.66	2.2893	23 7 28.5	3.558	16	5 52 48.81	2.2305	23 32 24.9	2.447
17	4 5 59.03	2.2897	23 10 58.2	3.431	17	5 55 2.56	2.2277	23 29 54.5	2.565
18	4 8 16.42	2.2901	23 14 20.2	3.304	18	5 57 16.13	2.2248	23 27 17.1	2.682
19	4 10 33.84	2.2904	23 17 34.7	3.178	19	5 59 29.53	2.2218	23 24 32.7	2.798
20	4 12 51.27	2.2906	23 20 41.5	3.051	20	6 1 42.75	2.2188	23 21 41.3	2.914
21	4 15 8.71	2.2908	23 23 40.8	2.924	21	6 3 55.79	2.2158	23 18 43.0	3.029
22	4 17 26.16	2.2908	23 26 32.4	2.796	22	6 6 8.64	2.2126	23 15 37.8	3.144
23	4 19 43.61	2.2908	23 29 16.3	2.668	23	6 8 21.30	2.2095	23 12 25.7	3.258
24	4 22 1.06	2.2908	N. 23 31 52.5	2.540	24	6 10 33.78	2.2063	N. 23 9 6.9	3.371

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 9.					SUNDAY 11.				
0	6 10 33.78	2.2063	N.23 9 6.9	3.371	0	7 52 10.72	2.0219	N.18 29 49.3	7.977
1	6 12 46.06	2.2031	23 5 41.2	3.484	1	7 54 11.92	2.0180	18 21 48.4	8.053
2	6 14 58.15	2.1998	23 2 8.8	3.596	2	7 56 12.88	2.0141	18 13 42.9	8.129
3	6 17 10.03	2.1963	22 58 29.7	3.708	3	7 58 13.61	2.0102	18 5 32.9	8.204
4	6 19 21.71	2.1930	22 54 43.9	3.819	4	8 0 14.10	2.0063	17 57 18.4	8.279
5	6 21 33.19	2.1897	22 50 51.4	3.929	5	8 2 14.37	2.0025	17 48 59.4	8.353
6	6 23 44.47	2.1862	22 46 52.4	4.038	6	8 4 14.40	1.9986	17 40 36.0	8.426
7	6 25 55.53	2.1826	22 42 46.8	4.148	7	8 6 14.20	1.9948	17 32 8.3	8.498
8	6 28 6.38	2.1791	22 38 34.6	4.257	8	8 8 13.77	1.9909	17 23 36.2	8.570
9	6 30 17.02	2.1755	22 34 16.0	4.363	9	8 10 13.11	1.9871	17 14 59.9	8.641
10	6 32 27.44	2.1719	22 29 51.0	4.470	10	8 12 12.22	1.9833	17 6 19.3	8.711
11	6 34 37.65	2.1683	22 25 19.6	4.577	11	8 14 11.11	1.9797	16 57 34.6	8.779
12	6 36 47.63	2.1645	22 20 41.8	4.683	12	8 16 9.78	1.9760	16 48 45.8	8.848
13	6 38 57.39	2.1608	22 15 57.7	4.787	13	8 18 8.23	1.9723	16 39 52.9	8.916
14	6 41 6.93	2.1572	22 11 7.3	4.892	14	8 20 6.45	1.9686	16 30 55.9	8.983
15	6 43 16.25	2.1534	22 6 10.7	4.994	15	8 22 4.46	1.9650	16 21 55.0	9.048
16	6 45 25.34	2.1496	22 1 8.0	5.097	16	8 24 2.25	1.9613	16 12 50.1	9.114
17	6 47 34.20	2.1457	21 55 59.1	5.199	17	8 25 59.82	1.9576	16 3 41.3	9.178
18	6 49 42.82	2.1418	21 50 44.1	5.301	18	8 27 57.19	1.9543	15 54 28.7	9.242
19	6 51 51.22	2.1381	21 45 23.0	5.401	19	8 29 54.34	1.9508	15 45 12.2	9.306
20	6 53 59.39	2.1342	21 39 56.0	5.500	20	8 31 51.28	1.9473	15 35 52.0	9.368
21	6 56 7.32	2.1303	21 34 23.0	5.599	21	8 33 48.01	1.9438	15 26 28.1	9.429
22	6 58 15.02	2.1263	21 28 44.1	5.698	22	8 35 44.54	1.9404	15 17 0.5	9.491
23	7 0 22.48	2.1223	N.21 22 59.3	5.795	23	8 37 40.86	1.9370	N.15 7 29.2	9.551
SATURDAY 10.					MONDAY 12.				
0	7 2 29.70	2.1184	N.21 17 8.7	5.892	0	8 39 36.98	1.9337	N.14 57 54.4	9.609
1	7 4 36.69	2.1144	21 11 12.3	5.988	1	8 41 32.90	1.9304	14 48 16.1	9.668
2	7 6 43.43	2.1104	21 5 10.2	6.083	2	8 43 28.63	1.9273	14 38 34.2	9.727
3	7 8 49.94	2.1065	20 59 2.4	6.177	3	8 45 24.17	1.9240	14 28 48.9	9.784
4	7 10 56.21	2.1024	20 52 49.0	6.270	4	8 47 19.51	1.9208	14 19 0.2	9.839
5	7 13 2.23	2.0984	20 46 30.0	6.363	5	8 49 14.66	1.9177	14 9 8.2	9.895
6	7 15 8.02	2.0944	20 40 5.4	6.456	6	8 51 9.63	1.9146	13 59 12.8	9.951
7	7 17 13.56	2.0903	20 33 35.3	6.547	7	8 53 4.41	1.9115	13 49 14.1	10.005
8	7 19 18.86	2.0863	20 26 59.8	6.637	8	8 54 59.01	1.9085	13 39 12.2	10.058
9	7 21 23.92	2.0823	20 20 18.9	6.727	9	8 56 53.43	1.9056	13 29 7.1	10.112
10	7 23 28.74	2.0783	20 13 32.6	6.816	10	8 58 47.68	1.9027	13 18 58.8	10.164
11	7 25 33.31	2.0742	20 6 41.0	6.903	11	9 0 41.75	1.8997	13 8 47.4	10.216
12	7 27 37.64	2.0702	19 59 44.2	6.990	12	9 2 35.64	1.8968	12 58 32.9	10.267
13	7 29 41.73	2.0661	19 52 42.2	7.077	13	9 4 29.37	1.8941	12 48 15.4	10.316
14	7 31 45.57	2.0620	19 45 35.0	7.163	14	9 6 22.93	1.8913	12 37 55.0	10.365
15	7 33 49.17	2.0580	19 38 22.6	7.248	15	9 8 16.33	1.8886	12 27 31.6	10.414
16	7 35 52.53	2.0540	19 31 5.2	7.332	16	9 10 9.56	1.8859	12 17 5.3	10.463
17	7 37 55.65	2.0499	19 23 42.8	7.415	17	9 12 2.64	1.8834	12 6 36.1	10.510
18	7 39 58.52	2.0459	19 16 15.4	7.498	18	9 13 55.57	1.8808	11 56 4.1	10.557
19	7 42 1.16	2.0419	19 8 43.1	7.579	19	9 15 48.34	1.8783	11 45 29.3	10.603
20	7 44 3.55	2.0378	19 1 5.9	7.660	20	9 17 40.96	1.8758	11 34 51.7	10.648
21	7 46 5.70	2.0338	18 53 23.9	7.740	21	9 19 33.44	1.8735	11 24 11.5	10.693
22	7 48 7.61	2.0299	18 45 37.1	7.819	22	9 21 25.78	1.8711	11 13 28.6	10.737
23	7 50 9.29	2.0259	18 37 45.6	7.898	23	9 23 17.97	1.8688	11 2 43.1	10.780
24	7 52 10.72	2.0219	N.18 29 49.3	7.977	24	9 25 10.03	1.8661	N.10 51 55.0	10.823

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 13.					THURSDAY 15.				
0	h m s	s	N. 10 51 55.0	10.823	0	h m s	s	N. 1 35 14.0	12.137
1	9 25 10.03	1.8664	10 41 4.4	10.864	1	10 53 13.25	1.8257	1 23 5.4	12.149
2	9 27 1.95	1.8642	10 30 11.3	10.906	2	10 55 2.81	1.8263	1 10 56.1	12.161
3	9 28 53.74	1.8622	10 19 15.7	10.947	3	10 56 52.41	1.8271	0 58 46.1	12.173
4	9 30 45.41	1.8601	10 8 17.7	10.987	4	10 58 42.06	1.8279	0 46 35.4	12.184
5	9 32 36.95	1.8579	9 57 17.3	11.027	5	11 0 31.76	1.8288	0 34 24.1	12.193
6	9 34 28.36	1.8559	9 46 14.5	11.065	6	11 2 21.51	1.8298	0 22 12.2	12.203
7	9 36 19.66	1.8540	9 35 9.5	11.103	7	11 4 11.33	1.8308	0 9 59.8	12.211
8	9 38 10.84	1.8522	9 24 2.2	11.141	8	11 6 1.20	1.8318	0 2 13.1	12.219
9	9 40 1.92	1.8503	9 12 52.6	11.178	9	11 7 51.15	1.8331	0 14 26.5	12.227
10	9 41 52.88	1.8485	9 1 40.8	11.214	10	11 9 41.17	1.8343	0 26 40.3	12.234
11	9 43 43.74	1.8468	8 50 26.9	11.249	11	11 11 31.26	1.8355	0 38 54.6	12.240
12	9 45 34.50	1.8451	8 39 10.9	11.284	12	11 13 21.43	1.8368	0 51 9.1	12.245
13	9 47 25.15	1.8434	8 27 52.8	11.318	13	11 15 11.68	1.8383	1 3 24.0	12.250
14	9 49 15.71	1.8419	8 16 32.7	11.353	14	11 17 2.02	1.8398	1 15 39.1	12.254
15	9 51 6.18	1.8404	8 5 10.5	11.385	15	11 18 52.46	1.8414	1 27 54.5	12.258
16	9 52 56.56	1.8390	7 53 46.4	11.418	16	11 20 42.99	1.8430	1 40 10.1	12.261
17	9 54 46.86	1.8377	7 42 20.3	11.450	17	11 22 33.62	1.8448	1 52 25.8	12.263
18	9 56 37.08	1.8363	7 30 52.4	11.481	18	11 24 24.36	1.8466	2 4 41.7	12.265
19	9 58 27.22	1.8350	7 19 22.6	11.513	19	11 26 15.21	1.8484	2 16 57.6	12.265
20	10 0 17.28	1.8338	7 7 50.9	11.543	20	11 28 6.17	1.8503	2 29 13.5	12.266
21	10 2 7.28	1.8328	6 56 17.5	11.571	21	11 29 57.24	1.8523	2 41 29.5	12.266
22	10 3 57.21	1.8316	6 44 42.4	11.600	22	11 31 48.44	1.8544	2 53 45.4	12.264
23	10 5 47.07	1.8305	N. 6 33 5.5	11.628	23	11 33 39.77	1.8565	S. 3 6 1.2	12.262
24	10 7 36.87	1.8296				11 35 31.22	1.8587		
WEDNESDAY 14.					FRIDAY 16.				
0	10 9 26.62	1.8237	N. 6 21 27.0	11.656	0	11 37 22.81	1.8610	S. 3 18 16.8	12.259
1	10 11 16.31	1.8278	6 9 46.8	11.683	1	11 39 14.54	1.8633	3 30 32.3	12.257
2	10 13 5.96	1.8271	5 58 5.1	11.709	2	11 41 6.41	1.8657	3 42 47.6	12.253
3	10 14 55.56	1.8263	5 46 21.7	11.736	3	11 42 58.43	1.8683	3 55 2.6	12.248
4	10 16 45.11	1.8256	5 34 36.8	11.761	4	11 44 50.60	1.8708	4 7 17.3	12.243
5	10 18 34.63	1.8250	5 22 50.4	11.785	5	11 46 42.92	1.8734	4 19 31.7	12.237
6	10 20 24.11	1.8244	5 11 2.6	11.808	6	11 48 35.41	1.8762	4 31 45.7	12.230
7	10 22 13.56	1.8240	4 59 13.4	11.832	7	11 50 28.06	1.8789	4 43 59.3	12.223
8	10 24 2.99	1.8236	4 47 22.7	11.855	8	11 52 20.88	1.8818	4 56 12.4	12.214
9	10 25 52.39	1.8232	4 35 30.8	11.877	9	11 54 13.87	1.8847	5 8 25.0	12.205
10	10 27 41.77	1.8229	4 23 37.5	11.899	10	11 56 7.04	1.8876	5 20 37.0	12.195
11	10 29 31.14	1.8227	4 11 42.9	11.920	11	11 58 0.88	1.8906	5 32 48.4	12.184
12	10 31 20.49	1.8225	3 59 47.1	11.940	12	11 59 53.91	1.8938	5 44 59.1	12.173
13	10 33 9.84	1.8224	3 47 50.1	11.960	13	12 1 47.63	1.8970	5 57 9.1	12.161
14	10 34 59.18	1.8223	3 35 51.9	11.979	14	12 3 41.55	1.9003	6 9 18.4	12.148
15	10 36 48.52	1.8224	3 23 52.6	11.998	15	12 5 35.67	1.9037	6 21 26.9	12.134
16	10 38 37.87	1.8226	3 11 52.2	12.015	16	12 7 29.99	1.9071	6 33 34.5	12.120
17	10 40 27.23	1.8227	2 59 50.8	12.033	17	12 9 24.52	1.9105	6 45 41.3	12.105
18	10 42 16.59	1.8228	2 47 48.3	12.050	18	12 11 19.25	1.9141	6 57 47.1	12.088
19	10 44 5.97	1.8232	2 35 44.8	12.066	19	12 13 14.21	1.9178	7 9 51.9	12.072
20	10 45 55.37	1.8236	2 23 40.4	12.081	20	12 15 9.38	1.9214	7 21 55.7	12.054
21	10 47 44.80	1.8240	2 11 35.1	12.096	21	12 17 4.78	1.9252	7 33 58.4	12.035
22	10 49 34.25	1.8244	1 59 28.9	12.111	22	12 19 0.40	1.9290	7 45 59.9	12.016
23	10 51 23.73	1.8250	1 47 21.8	12.124	23	12 20 56.26	1.9329	7 58 0.3	11.995
24	10 53 13.25	1.8257	N. 1 35 14.0	12.137	24	12 22 52.35	1.9369	S. 8 9 59.3	11.973

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 17.					MONDAY 19.				
0	12 22 52.35	1.9369	S. 8 9 59.3	11.973	0	14 1 42.41	2.2042	S. 17 1 25.6	9.738
1	12 24 48.69	1.9410	8 21 57.1	11.952	1	14 3 54.87	2.2111	17 11 7.6	9.661
2	12 26 45.27	1.9451	8 33 53.5	11.928	2	14 6 7.74	2.2179	17 20 44.9	9.583
3	12 28 42.10	1.9493	8 45 48.5	11.905	3	14 8 21.02	2.2248	17 30 17.5	9.505
4	12 30 39.18	1.9536	8 57 42.1	11.881	4	14 10 34.72	2.2318	17 39 45.3	9.423
5	12 32 36.53	1.9579	9 9 34.2	11.855	5	14 12 48.84	2.2388	17 49 8.3	9.342
6	12 34 34.13	1.9623	9 21 24.7	11.828	6	14 15 3.38	2.2458	17 58 26.3	9.258
7	12 36 32.00	1.9668	9 33 13.5	11.800	7	14 17 18.34	2.2528	18 7 39.2	9.173
8	12 38 30.15	1.9713	9 45 0.7	11.772	8	14 19 33.72	2.2599	18 16 47.0	9.086
9	12 40 28.56	1.9759	9 56 46.2	11.742	9	14 21 49.53	2.2670	18 25 49.5	8.998
10	12 42 27.26	1.9807	10 8 29.8	11.712	10	14 24 5.76	2.2741	18 34 46.8	8.910
11	12 44 26.24	1.9854	10 20 11.6	11.680	11	14 26 22.42	2.2812	18 43 38.7	8.819
12	12 46 25.51	1.9903	10 31 51.4	11.647	12	14 28 39.50	2.2883	18 52 25.1	8.727
13	12 48 25.07	1.9951	10 43 29.3	11.615	13	14 30 57.01	2.2955	19 1 5.9	8.633
14	12 50 24.92	2.0001	10 55 5.2	11.581	14	14 33 14.96	2.3027	19 9 41.1	8.538
15	12 52 25.08	2.0051	11 6 39.0	11.545	15	14 35 33.33	2.3098	19 18 10.5	8.442
16	12 54 25.53	2.0102	11 18 10.6	11.508	16	14 37 52.13	2.3169	19 26 34.1	8.343
17	12 56 26.30	2.0154	11 29 40.0	11.472	17	14 40 11.36	2.3241	19 34 51.7	8.243
18	12 58 27.38	2.0206	11 41 7.2	11.433	18	14 42 31.02	2.3313	19 43 3.3	8.143
19	13 0 28.77	2.0258	11 52 32.0	11.393	19	14 44 51.11	2.3384	19 51 8.8	8.041
20	13 2 30.47	2.0311	12 3 54.4	11.353	20	14 47 11.63	2.3456	19 59 8.2	7.937
21	13 4 32.50	2.0366	12 15 14.3	11.311	21	14 49 32.58	2.3528	20 7 1.2	7.831
22	13 6 34.86	2.0421	12 26 31.7	11.268	22	14 51 53.96	2.3599	20 14 47.9	7.724
23	13 8 37.55	2.0477	S. 12 37 46.5	11.225	23	14 54 15.77	2.3670	S. 20 22 28.1	7.615
SUNDAY 18.					TUESDAY 20.				
0	13 10 40.58	2.0533	S. 12 48 58.7	11.180	0	14 56 38.00	2.3741	S. 20 30 1.7	7.505
1	13 12 43.94	2.0589	13 0 8.1	11.133	1	14 59 0.66	2.3813	20 37 28.7	7.394
2	13 14 47.65	2.0647	13 11 14.7	11.086	2	15 1 23.75	2.3885	20 44 49.0	7.281
3	13 16 51.70	2.0704	13 22 18.4	11.038	3	15 3 47.26	2.3954	20 52 2.4	7.166
4	13 18 56.10	2.0763	13 33 19.2	10.988	4	15 6 11.20	2.4025	20 59 8.9	7.050
5	13 21 0.85	2.0821	13 44 16.9	10.937	5	15 8 35.56	2.4094	21 6 8.4	6.933
6	13 23 5.95	2.0881	13 55 11.6	10.886	6	15 11 0.33	2.4164	21 13 0.8	6.813
7	13 25 11.42	2.0942	14 6 3.2	10.833	7	15 13 25.53	2.4234	21 19 46.0	6.693
8	13 27 17.25	2.1003	14 16 51.5	10.778	8	15 15 51.14	2.4305	21 26 24.0	6.572
9	13 29 23.45	2.1063	14 27 36.5	10.723	9	15 18 17.16	2.4376	21 32 54.6	6.448
10	13 31 30.01	2.1125	14 38 18.2	10.666	10	15 20 43.60	2.4440	21 39 17.7	6.323
11	13 33 36.95	2.1188	14 48 56.4	10.608	11	15 23 10.44	2.4508	21 45 33.3	6.197
12	13 35 44.26	2.1250	14 59 31.1	10.548	12	15 25 37.69	2.4575	21 51 41.3	6.069
13	13 37 51.95	2.1314	15 10 2.2	10.488	13	15 28 5.34	2.4643	21 57 41.6	5.939
14	13 40 0.03	2.1378	15 20 29.7	10.427	14	15 30 33.40	2.4709	22 3 34.0	5.808
15	13 42 8.49	2.1443	15 30 53.4	10.363	15	15 33 1.85	2.4775	22 9 18.5	5.676
16	13 44 17.34	2.1508	15 41 13.3	10.299	16	15 35 30.70	2.4840	22 14 55.1	5.543
17	13 46 26.58	2.1573	15 51 29.3	10.233	17	15 37 59.93	2.4904	22 20 23.6	5.408
18	13 48 36.21	2.1638	16 1 41.3	10.167	18	15 40 29.55	2.4968	22 25 44.0	5.271
19	13 50 46.24	2.1705	16 11 49.3	10.099	19	15 42 59.55	2.5031	22 30 56.1	5.133
20	13 52 56.67	2.1772	16 21 53.2	10.029	20	15 45 29.92	2.5093	22 36 0.0	4.994
21	13 55 7.50	2.1838	16 31 52.8	9.958	21	15 48 0.67	2.5156	22 40 55.4	4.853
22	13 57 18.73	2.1906	16 41 48.1	9.886	22	15 50 31.79	2.5217	22 45 42.4	4.712
23	13 59 30.37	2.1973	16 51 39.1	9.813	23	15 53 3.27	2.5277	22 50 20.8	4.568
24	14 1 42.41	2.2042	S. 17 1 25.6	9.738	24	15 55 35.11	2.5336	S. 22 54 50.6	4.424

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 21.					FRIDAY 23.				
0	15 55 35.11	a. 5336	S. 22 54 50.6	4.424	0	18 1 48.90	a. 6723	S. 23 21 52.4	3.583
1	15 58 7.30	a. 5394	22 59 11.7	4.278	1	18 4 29.22	a. 6715	23 18 15.9	3.595
2	16 0 39.84	a. 5452	23 3 23.9	4.130	2	18 7 9.48	a. 6706	23 14 29.0	3.867
3	16 3 12.73	a. 5509	23 7 27.3	3.982	3	18 9 49.69	a. 6697	23 10 31.8	4.098
4	16 5 45.95	a. 5564	23 11 21.8	3.833	4	18 12 29.84	a. 6685	23 6 24.4	4.209
5	16 8 19.50	a. 5618	23 15 7.3	3.682	5	18 15 9.91	a. 6671	23 2 6.7	4.380
6	16 10 53.37	a. 5672	23 18 43.6	3.529	6	18 17 49.89	a. 6656	22 57 38.8	4.549
7	16 13 27.57	a. 5726	23 22 10.8	3.377	7	18 20 29.78	a. 6640	22 53 0.8	4.718
8	16 16 2.08	a. 5777	23 25 28.8	3.223	8	18 23 9.57	a. 6623	22 48 12.6	4.887
9	16 18 36.89	a. 5827	23 28 37.5	3.068	9	18 25 49.25	a. 6604	22 43 14.3	5.055
10	16 21 12.00	a. 5876	23 31 36.9	2.911	10	18 28 28.82	a. 6584	22 38 6.0	5.222
11	16 23 47.40	a. 5924	23 34 26.8	2.753	11	18 31 8.26	a. 6562	22 32 47.7	5.388
12	16 26 23.09	a. 5972	23 37 7.2	2.594	12	18 33 47.56	a. 6538	22 27 19.4	5.554
13	16 28 59.06	a. 6017	23 39 38.1	2.435	13	18 36 26.72	a. 6514	22 21 41.2	5.718
14	16 31 35.29	a. 6061	23 41 59.4	2.274	14	18 39 5.73	a. 6489	22 15 53.2	5.883
15	16 34 11.79	a. 6105	23 44 11.0	2.113	15	18 41 44.59	a. 6462	22 9 55.3	6.046
16	16 36 48.55	a. 6147	23 46 12.9	1.950	16	18 44 23.28	a. 6433	22 3 47.7	6.208
17	16 39 25.55	a. 6188	23 48 5.0	1.787	17	18 47 1.79	a. 6404	21 57 30.4	6.368
18	16 42 2.80	a. 6227	23 49 47.3	1.623	18	18 49 40.13	a. 6374	21 51 3.5	6.528
19	16 44 40.27	a. 6264	23 51 19.7	1.457	19	18 52 18.28	a. 6342	21 44 27.0	6.688
20	16 47 17.97	a. 6302	23 52 42.1	1.291	20	18 54 56.23	a. 6309	21 37 41.0	6.845
21	16 49 55.89	a. 6337	23 53 54.6	1.125	21	18 57 33.99	a. 6276	21 30 45.6	7.002
22	16 52 34.01	a. 6371	23 54 57.1	0.958	22	19 0 11.54	a. 6240	21 23 40.8	7.158
23	16 55 12.34	a. 6404	S. 23 55 49.5	0.790	23	19 2 48.87	a. 6204	S. 21 16 26.7	7.312
THURSDAY 22.					SATURDAY 24.				
0	16 57 50.86	a. 6435	S. 23 56 31.9	0.622	0	19 5 25.99	a. 6167	S. 21 9 3.4	7.465
1	17 0 29.56	a. 6464	23 57 4.1	0.452	1	19 8 2.88	a. 6128	21 1 30.9	7.617
2	17 3 8.43	a. 6493	23 57 26.1	0.282	2	19 10 39.53	a. 6089	20 53 49.4	7.767
3	17 5 47.47	a. 6519	23 57 37.9	- 0.112	3	19 13 15.95	a. 6049	20 45 58.9	7.917
4	17 8 26.66	a. 6543	23 57 39.5	+ 0.059	4	19 15 52.12	a. 6008	20 37 59.4	8.065
5	17 11 5.99	a. 6568	23 57 30.8	0.232	5	19 18 28.04	a. 5966	20 29 51.1	8.212
6	17 13 45.47	a. 6590	23 57 11.7	0.403	6	19 21 3.71	a. 5923	20 21 34.0	8.357
7	17 16 25.07	a. 6610	23 56 42.4	0.575	7	19 23 39.12	a. 5880	20 13 8.3	8.500
8	17 19 4.79	a. 6629	23 56 2.7	0.748	8	19 26 14.27	a. 5836	20 4 34.0	8.643
9	17 21 44.62	a. 6647	23 55 12.7	0.920	9	19 28 49.15	a. 5790	19 55 51.2	8.784
10	17 24 24.55	a. 6665	23 54 12.3	1.094	10	19 31 23.75	a. 5743	19 46 59.9	8.924
11	17 27 4.57	a. 6682	23 53 1.4	1.268	11	19 33 58.07	a. 5697	19 38 0.3	9.062
12	17 29 44.68	a. 6691	23 51 40.2	1.441	12	19 36 32.11	a. 5649	19 28 52.5	9.198
13	17 32 24.86	a. 6702	23 50 8.5	1.615	13	19 39 5.86	a. 5602	19 19 36.6	9.333
14	17 35 5.10	a. 6711	23 48 26.4	1.788	14	19 41 39.33	a. 5553	19 10 12.6	9.467
15	17 37 45.39	a. 6719	23 46 33.9	1.962	15	19 44 12.50	a. 5503	19 0 40.6	9.598
16	17 40 25.73	a. 6726	23 44 31.0	2.136	16	19 46 45.37	a. 5454	18 51 0.8	9.728
17	17 43 6.10	a. 6731	23 42 17.6	2.310	17	19 49 17.95	a. 5404	18 41 13.3	9.856
18	17 45 46.50	a. 6734	23 39 53.8	2.483	18	19 51 50.22	a. 5353	18 31 18.1	9.983
19	17 48 26.91	a. 6736	23 37 19.6	2.658	19	19 54 22.18	a. 5302	18 21 15.3	10.109
20	17 51 7.33	a. 6737	23 34 34.9	2.831	20	19 56 53.84	a. 5250	18 11 5.0	10.232
21	17 53 47.75	a. 6736	23 31 39.9	3.004	21	19 59 25.18	a. 5198	18 0 47.4	10.354
22	17 56 28.16	a. 6733	23 28 34.4	3.178	22	20 1 56.21	a. 5145	17 50 22.5	10.474
23	17 59 8.54	a. 6728	23 25 18.6	3.350	23	20 4 26.92	a. 5093	17 39 50.5	10.593
24	18 1 48.90	a. 6723	S. 23 21 52.4	3.523	24	20 6 57.32	a. 5040	S. 17 29 11.4	10.709



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 25.					TUESDAY 27.				
0	h m s	s	S. 17 29 11.4	10.709	0	h m s	s	S. 7 14 54.9	14.197
1	20 9 27.40	2.4986	17 18 25.4	10.824	1	22 1 16.86	2.2549	7 0 42.2	14.227
2	20 11 57.15	2.4932	17 7 32.5	10.937	2	22 5 32.03	2.2508	6 46 27.7	14.255
3	20 14 26.58	2.4878	16 56 32.9	11.043	3	22 7 46.96	2.2468	6 32 11.6	14.282
4	20 16 55.68	2.4823	16 45 26.7	11.137	4	22 10 1.65	2.2428	6 17 53.9	14.307
5	20 19 24.46	2.4770	16 34 14.0	11.265	5	22 12 16.10	2.2390	6 3 34.8	14.329
6	20 21 52.92	2.4715	16 22 54.9	11.378	6	22 14 30.33	2.2353	5 49 14.4	14.351
7	20 24 21.04	2.4660	16 11 29.4	11.477	7	22 16 44.33	2.2314	5 34 52.7	14.372
8	20 26 48.84	2.4606	15 59 57.7	11.579	8	22 18 58.10	2.2277	5 20 29.8	14.390
9	20 29 16.31	2.4551	15 48 19.9	11.680	9	22 21 11.65	2.2241	5 6 5.9	14.407
10	20 31 43.45	2.4497	15 36 36.1	11.778	10	22 23 24.99	2.2205	4 51 41.0	14.423
11	20 34 10.27	2.4442	15 24 46.5	11.874	11	22 25 38.11	2.2170	4 37 15.2	14.437
12	20 36 36.75	2.4386	15 12 51.2	11.969	12	22 27 51.03	2.2137	4 22 48.6	14.448
13	20 39 2.90	2.4332	15 0 50.2	12.063	13	22 30 3.75	2.2103	4 8 21.4	14.459
14	20 41 28.73	2.4278	14 48 43.6	12.156	14	22 32 16.26	2.2069	3 53 53.5	14.469
15	20 43 54.23	2.4223	14 36 31.5	12.245	15	22 34 28.58	2.2038	3 39 25.1	14.477
16	20 46 19.40	2.4168	14 24 14.2	12.333	16	22 36 40.71	2.2007	3 24 56.3	14.483
17	20 48 44.24	2.4113	14 11 51.6	12.419	17	22 38 52.66	2.1976	3 10 27.2	14.488
18	20 51 8.76	2.4060	13 59 23.9	12.503	18	22 41 4.42	2.1945	2 55 57.8	14.491
19	20 53 32.96	2.4006	13 46 51.2	12.586	19	22 43 16.00	2.1916	2 41 28.3	14.493
20	20 55 56.83	2.3951	13 34 13.6	12.667	20	22 45 27.41	2.1888	2 26 58.7	14.493
21	20 58 20.37	2.3898	13 21 31.2	12.745	21	22 47 38.65	2.1860	2 12 29.1	14.493
22	21 0 43.60	2.3844	13 8 44.2	12.822	22	22 49 49.73	2.1833	1 57 59.5	14.491
23	21 3 6.50	2.3791	S. 12 55 52.6	12.898	23	22 52 0.64	2.1805	S. 1 43 30.2	14.486
MONDAY 26.					WEDNESDAY 28.				
0	21 5 29.09	2.3738	S. 12 42 56.5	12.971	0	22 54 11.39	2.1779	S. 1 29 1.2	14.481
1	21 7 51.36	2.3685	12 29 56.1	13.042	1	22 56 21.99	2.1754	1 14 32.5	14.475
2	21 10 13.31	2.3633	12 16 51.5	13.111	2	22 58 32.44	2.1730	1 0 4.2	14.467
3	21 12 34.95	2.3581	12 3 42.8	13.179	3	23 0 42.75	2.1707	0 45 36.5	14.458
4	21 14 56.28	2.3529	11 50 30.0	13.246	4	23 2 52.92	2.1683	0 31 9.3	14.448
5	21 17 17.30	2.3478	11 37 13.3	13.309	5	23 5 2.95	2.1660	0 16 42.8	14.435
6	21 19 38.02	2.3428	11 23 52.9	13.372	6	23 7 12.84	2.1638	S. 0 2 17.1	14.422
7	21 21 58.43	2.3377	11 10 28.7	13.433	7	23 9 22.61	2.1618	N. 0 12 7.8	14.408
8	21 24 18.54	2.3326	10 57 0.9	13.492	8	23 11 32.26	2.1598	0 26 31.8	14.391
9	21 26 38.34	2.3276	10 43 29.6	13.549	9	23 13 41.78	2.1578	0 40 54.7	14.373
10	21 28 57.85	2.3228	10 29 55.0	13.604	10	23 15 51.19	2.1559	0 55 16.6	14.356
11	21 31 17.07	2.3178	10 16 17.1	13.657	11	23 18 0.49	2.1541	1 9 37.4	14.336
12	21 33 35.99	2.3130	10 2 36.1	13.709	12	23 20 9.68	2.1523	1 23 56.9	14.314
13	21 35 54.63	2.3083	9 48 52.0	13.759	13	23 22 18.77	2.1507	1 38 15.1	14.292
14	21 38 12.98	2.3034	9 35 5.0	13.808	14	23 24 27.76	2.1490	1 52 31.9	14.268
15	21 40 31.04	2.2987	9 21 15.1	13.854	15	23 26 36.65	2.1474	2 6 47.3	14.244
16	21 42 48.83	2.2942	9 7 22.5	13.899	16	23 28 45.45	2.1460	2 21 1.2	14.218
17	21 45 6.34	2.2896	8 53 27.2	13.943	17	23 30 54.17	2.1447	2 35 13.4	14.190
18	21 47 23.58	2.2850	8 39 29.4	13.984	18	23 33 2.81	2.1433	2 49 24.0	14.162
19	21 49 40.54	2.2805	8 25 29.1	14.024	19	23 35 11.36	2.1419	3 3 32.8	14.132
20	21 51 57.24	2.2762	8 11 26.5	14.062	20	23 37 19.84	2.1407	3 17 39.8	14.101
21	21 54 13.68	2.2718	7 57 21.7	14.098	21	23 39 28.25	2.1396	3 31 44.9	14.068
22	21 56 29.86	2.2675	7 43 14.8	14.133	22	23 41 36.59	2.1385	3 45 48.0	14.035
23	21 58 45.78	2.2632	7 29 5.8	14.166	23	23 43 44.87	2.1375	3 59 49.1	14.001
24	22 1 1.44	2.2590	S. 7 14 54.9	14.197	24	23 45 53.09	2.1366	N. 4 13 48.1	13.965

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
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THURSDAY 29.

	h	m	s						
0	23	45	53.09	2.1366	N. 4	13	48.1	13.965	
1	23	48	1.26	2.1358		4	27 44.9	13.928	
2	23	50	9.38	2.1350		4	41 39.5	13.890	
3	23	52	17.46	2.1343		4	55 31.7	13.851	
4	23	54	25.49	2.1335		5	9 21.6	13.811	
5	23	56	33.48	2.1329		5	23 9.0	13.769	
6	23	58	41.44	2.1324		5	36 53.9	13.727	
7	0	0	49.37	2.1319		5	50 36.2	13.683	
8	0	2	57.27	2.1314		6	4 15.9	13.638	
9	0	5	5.14	2.1311		6	17 52.8	13.592	
10	0	7	13.00	2.1308		6	31 26.9	13.545	
11	0	9	20.84	2.1305		6	44 58.2	13.498	
12	0	11	28.66	2.1303		6	58 26.6	13.448	
13	0	13	36.48	2.1302		7	11 52.0	13.398	
14	0	15	44.29	2.1302		7	25 14.4	13.347	
15	0	17	52.10	2.1302		7	38 33.6	13.294	
16	0	19	59.91	2.1303		7	51 49.7	13.242	
17	0	22	7.73	2.1303		8	5 2.6	13.188	
18	0	24	15.55	2.1305		8	18 12.2	13.133	
19	0	26	23.39	2.1308		8	31 18.5	13.076	
20	0	28	31.25	2.1311		8	44 21.3	13.018	
21	0	30	39.12	2.1313		8	57 20.6	12.959	
22	0	32	47.01	2.1318		9	10 16.4	12.900	
23	0	34	54.93	2.1323	N. 9	23 8.6	12.840		

FRIDAY 30.

	h	m	s						
0	0	37	2.88	2.1328	N. 9	35 57.2	12.779		
1	0	39	10.86	2.1333		9	48 42.1	12.717	
2	0	41	18.87	2.1338		10	1 23.2	12.653	
3	0	43	26.92	2.1345		10	14 0.4	12.588	
4	0	45	35.01	2.1353		10	26 33.8	12.524	
5	0	47	43.15	2.1360		10	39 3.3	12.457	
6	0	49	51.33	2.1368		10	51 28.7	12.389	
7	0	51	59.56	2.1376		11	3 50.0	12.321	
8	0	54	7.84	2.1385		11	16 7.2	12.253	
9	0	56	16.18	2.1394		11	28 20.3	12.183	
10	0	58	24.57	2.1404		11	40 29.2	12.112	
11	1	0	33.03	2.1414		11	52 33.7	12.039	
12	1	2	41.54	2.1424		12	4 33.9	11.967	
13	1	4	50.12	2.1436		12	16 29.7	11.893	
14	1	6	58.77	2.1448		12	28 21.1	11.819	
15	1	9	7.49	2.1459		12	40 8.0	11.743	
16	1	11	16.28	2.1471		12	51 50.3	11.667	
17	1	13	25.14	2.1483		13	3 28.0	11.589	
18	1	15	34.08	2.1497		13	15 1.0	11.511	
19	1	17	43.10	2.1509		13	26 29.3	11.432	
20	1	19	52.19	2.1523		13	37 52.8	11.352	
21	1	22	1.37	2.1538		13	49 11.5	11.272	
22	1	24	10.64	2.1552		14	0 25.4	11.190	
23	1	26	19.99	2.1566		14	11 34.3	11.107	
24	1	28	29.43	2.1581	N.14	22 38.2	11.023		

SATURDAY, JULY 1.

	h	m	s						
0	1	28	29.43	2.1581	N.14	22 38.2	11.023		

PHASES OF THE MOON.

		d	h	m
●	New Moon . . . . .	June	7	18 20.4
☾	First Quarter . . . . .		15	21 46.5
○	Full Moon . . . . .		23	2 20.1
☾	Last Quarter . . . . .		29	16 44.9

		d	h
☾	Apogee . . . . .	June	12 15.0
☾	Perigee . . . . .		24 16.7

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	SATURN W.	86 36 31	2352	88 21 15	2360	90 5 47	2368	91 50 7	2376
	α Aquilæ W.	50 53 53	3223	52 19 35	3193	53 45 53	3165	55 12 44	3142
	α Arietis E.	48 10 16	2411	46 26 57	2422	44 43 54	2433	43 1 7	2445
	VENUS E.	54 56 22	2792	53 21 44	2803	51 47 20	2813	50 13 9	2824
	SUN E.	82 54 4	2681	81 16 59	2691	79 40 7	2700	78 3 27	2709
2	SATURN W.	100 28 42	2419	102 11 49	2429	103 54 43	2437	105 37 25	2446
	α Aquilæ W.	62 32 58	3064	64 1 52	3054	65 30 58	3047	67 0 13	3040
	VENUS E.	42 25 46	2880	40 53 1	2891	39 20 31	2903	37 48 16	2916
	SUN E.	70 3 8	2754	68 27 40	2764	66 52 25	2773	65 17 22	2782
3	α Aquilæ W.	74 27 49	3029	75 57 26	3030	77 27 2	3032	78 56 35	3034
	Fomalhaut W.	49 33 54	3345	50 57 13	3315	52 21 7	3288	53 45 32	3265
	SUN E.	57 25 9	2829	55 51 19	2838	54 17 41	2848	52 44 15	2856
4	α Aquilæ W.	86 23 9	3061	87 52 6	3069	89 20 54	3077	90 49 32	3087
	Fomalhaut W.	60 53 29	3186	62 19 55	3177	63 46 32	3169	65 13 18	3162
	α Pegasi W.	38 42 27	2927	40 14 11	2912	41 46 15	2901	43 18 33	2891
	SUN E.	45 0 2	2904	43 27 48	2912	41 55 45	2922	40 23 54	2931
5	Fomalhaut W.	72 28 37	3149	73 55 47	3149	75 22 57	3151	76 50 5	3153
	α Pegasi W.	51 2 20	2869	52 35 19	2868	54 8 19	2868	55 41 19	2869
	SUN E.	32 47 40	2980	31 17 2	2989	29 46 35	2998	28 16 20	3009
6	Fomalhaut W.	84 4 42	3177	85 31 19	3184	86 57 47	3192	88 24 6	3199
	α Pegasi W.	63 25 40	2884	64 58 19	2889	66 30 52	2894	68 3 19	2899
	SUN E.	20 48 13	3060	19 19 14	3069	17 50 27	3081	16 21 54	3092
9	SUN W.	14 2 16	3229	15 26 40	3227	16 50 55	3205	18 15 1	3212
	MARS E.	53 54 58	3158	52 27 59	3169	51 1 13	3179	49 34 39	3188
	Regulus E.	56 0 38	2950	54 29 23	2959	52 58 19	2969	51 27 27	2977
10	SUN W.	25 13 28	3347	26 36 45	3355	27 59 53	3361	29 22 54	3368
	MARS E.	42 24 43	3238	40 59 19	3249	39 34 8	3259	38 9 9	3270
	Regulus E.	43 55 53	3022	42 26 7	3031	40 56 33	3039	39 27 9	3049
	Spica E.	97 51 4	2992	96 20 41	2998	94 50 26	3005	93 20 19	3012
	JUPITER E.	106 14 12	2988	104 43 50	2980	103 13 36	3005	101 43 30	3012
11	SUN W.	36 16 8	3398	37 38 27	3403	39 0 40	3408	40 22 47	3413
	Regulus E.	32 3 2	3097	30 34 49	3107	29 6 48	3119	27 39 1	3130
	Spica E.	85 51 41	3040	84 22 18	3045	82 53 1	3050	81 23 50	3055
	JUPITER E.	94 14 52	3040	92 45 29	3015	91 16 12	3050	89 47 1	3055
12	SUN W.	47 12 12	3431	48 33 54	3434	49 55 32	3436	51 17 8	3438
	Spica E.	73 59 11	3072	72 30 27	3075	71 1 47	3077	69 33 9	3079
	JUPITER E.	82 22 23	3073	80 53 40	3076	79 25 1	3078	77 56 25	3080
13	SUN W.	58 4 44	3441	59 26 14	3440	60 47 45	3439	62 9 17	3438
	Pollux W.	30 18 24	3270	31 43 11	3253	33 8 17	3240	34 33 39	3226
	Spica E.	62 10 26	3082	60 41 55	3082	59 13 24	3082	57 44 52	3081
	JUPITER E.	70 33 55	3086	69 5 28	3087	67 37 2	3086	66 8 35	3085
	Antares E.	107 42 59	3081	106 14 26	3080	104 45 52	3079	103 17 17	3078

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	SATURN	W.	93 34 14	2386	95 18 9	2394	97 1 52	2403	98 45 23	2411
	α Aquilæ	W.	56 40 3	3121	58 7 47	3103	59 35 53	3088	61 4 17	3074
	α Arietis	E.	41 18 36	2457	39 36 22	2470	37 54 26	2483	36 12 49	2496
	VENUS	E.	48 39 12	2835	47 5 29	2845	45 32 0	2857	43 58 46	2868
	SUN	E.	76 26 59	2718	74 50 43	2727	73 14 39	2736	71 38 47	2746
2	SATURN	W.	107 19 54	2455	109 2 11	2463	110 44 16	2472	112 26 9	2480
	α Aquilæ	W.	68 29 36	3096	69 59 4	3032	71 28 37	3030	72 58 12	3029
	VENUS	E.	36 16 18	2929	34 44 36	2943	33 13 12	2957	31 42 5	2971
	SUN	E.	63 42 31	2792	62 7 52	2801	60 33 26	2810	58 59 11	2820
3	α Aquilæ	W.	80 26 5	3099	81 55 30	3043	83 24 50	3048	84 54 3	3054
	Fomalhaut	W.	55 10 25	3244	56 35 42	3226	58 1 20	3211	59 27 16	3197
	SUN	E.	51 11 0	2866	49 37 57	2876	48 5 7	2885	46 32 29	2894
4	α Aquilæ	W.	92 17 58	3096	93 46 12	3106	95 14 14	3118	96 42 2	3129
	Fomalhaut	W.	66 40 13	3157	68 7 14	3153	69 34 19	3151	71 1 27	3149
	α Pegasi	W.	44 51 4	2883	46 23 44	2878	47 56 31	2873	49 29 24	2871
	SUN	E.	38 52 15	2941	37 20 48	2950	35 49 33	2960	34 18 30	2970
5	Fomalhaut	W.	78 17 10	3157	79 44 11	3161	81 11 7	3165	82 37 58	3171
	α Pegasi	W.	57 14 17	2871	58 47 13	2873	60 20 6	2876	61 52 55	2880
	SUN	E.	26 46 18	3018	25 16 28	3028	23 46 50	3039	22 17 25	3049
6	Fomalhaut	W.	89 50 16	3209	91 16 15	3218	92 42 3	3228	94 7 39	3239
	α Pegasi	W.	69 35 39	2905	71 7 52	2911	72 39 57	2917	74 11 54	2924
	SUN	E.	14 53 35	3105	13 25 31	3117	11 57 42	3131	10 30 10	3148
9	SUN	W.	19 38 59	3319	21 2 49	3326	22 26 30	3333	23 50 3	3340
	MARS	E.	48 8 16	3198	46 42 5	3209	45 16 6	3219	43 50 19	3228
	Regulus	E.	49 56 46	2986	48 26 16	2995	46 55 57	3004	45 25 49	3014
10	SUN	W.	30 45 47	3374	32 8 33	3381	33 31 11	3386	34 53 43	3393
	MARS	E.	36 44 22	3281	35 19 48	3292	33 55 27	3303	32 31 19	3315
	Regulus	E.	37 57 57	3058	36 28 56	3067	35 0 6	3077	33 31 28	3087
	Spica	E.	91 50 21	3018	90 20 30	3024	88 50 47	3030	87 21 11	3034
	JUPITER	E.	100 13 32	3018	98 43 41	3024	97 13 58	3030	95 44 22	3034
11	SUN	W.	41 44 49	3417	43 6 46	3421	44 28 39	3425	45 50 27	3428
	Regulus	E.	26 11 28	3143	24 44 11	3158	23 17 11	3174	21 50 31	3196
	Spica	E.	79 54 45	3059	78 25 45	3062	76 56 49	3066	75 27 58	3069
	JUPITER	E.	88 17 56	3059	86 48 56	3062	85 20 0	3066	83 51 9	3070
12	SUN	W.	52 38 41	3439	54 0 13	3440	55 21 44	3441	56 43 14	3441
	Spica	E.	68 4 34	3080	66 36 0	3082	65 7 28	3082	63 38 57	3082
	JUPITER	E.	76 27 51	3082	74 59 20	3083	73 30 50	3083	72 2 22	3086
13	SUN	W.	63 30 51	3436	64 52 27	3433	66 14 6	3430	67 35 49	3427
	Pollux	W.	35 59 17	3214	37 25 9	3202	38 51 16	3191	40 17 36	3181
	Spica	E.	56 16 19	3079	54 47 44	3077	53 19 6	3073	51 50 26	3072
	JUPITER	E.	64 40 7	3084	63 11 38	3083	61 43 8	3081	60 14 35	3079
	Antares	E.	101 48 41	3076	100 20 2	3074	98 51 21	3071	97 22 36	3068

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
14	SUN W.	68 57 35	3423	70 19 26	3419	71 41 21	3414	73 3 22	3408
	Pollux W.	41 44 8	3170	43 10 53	3161	44 37 49	3151	46 4 57	3141
	Spica E.	50 21 42	3069	48 52 54	3065	47 24 2	3061	45 55 5	3056
	JUPITER E.	58 46 0	3077	57 17 22	3073	55 48 40	3071	54 19 55	3067
	Antares E.	95 53 47	3065	94 24 54	3060	92 55 56	3056	91 26 52	3051
	SATURN E.	108 11 4	3037	106 41 37	3033	105 12 5	3028	103 42 27	3023
15	SUN W.	79 55 11	3374	81 17 57	3365	82 40 53	3357	84 3 59	3347
	Pollux W.	53 23 36	3091	54 51 56	3081	56 20 29	3070	57 49 15	3059
	Spica E.	38 28 48	3029	36 59 11	3022	35 29 26	3015	33 59 32	3008
	JUPITER E.	46 54 55	3045	45 25 38	3039	43 56 14	3034	42 26 44	3029
	Antares E.	83 59 51	3019	82 30 2	3012	81 0 4	3004	79 29 56	2995
	SATURN E.	96 12 35	2992	94 42 12	2985	93 11 40	2977	91 40 58	2967
16	SUN W.	91 2 22	3294	92 26 41	3281	93 51 15	3269	95 16 3	3255
	Pollux W.	65 16 35	3001	66 46 47	2988	68 17 15	2975	69 47 59	2962
	Regulus W.	28 14 37	3011	29 44 36	2994	31 14 56	2977	32 45 37	2961
	MARS W.	26 42 49	3251	28 7 58	3230	29 33 32	3209	30 59 30	3190
	Antares E.	71 56 24	2946	70 25 4	2935	68 53 29	2924	67 21 40	2911
	SATURN E.	84 4 32	2919	82 32 37	2907	81 0 27	2896	79 28 3	2883
17	SUN W.	102 24 7	3183	103 50 36	3168	105 17 23	3152	106 44 30	3136
	Pollux W.	77 25 55	2891	78 58 25	2876	80 31 14	2862	82 4 22	2846
	Regulus W.	40 24 17	2878	41 57 4	2861	43 30 13	2844	45 3 44	2828
	MARS W.	38 15 6	3096	39 43 21	3078	41 11 58	3059	42 40 58	3040
	Antares E.	59 38 34	2846	58 5 6	2831	56 31 19	2817	54 57 13	2802
	SATURN E.	71 42 1	2818	70 7 57	2804	68 33 34	2790	66 58 53	2775
18	Pollux W.	89 55 9	2766	91 30 22	2749	93 5 57	2732	94 41 54	2715
	Regulus W.	52 56 48	2741	54 32 33	2724	56 8 41	2706	57 45 13	2687
	MARS W.	50 11 42	2947	51 43 1	2928	53 14 44	2909	54 46 51	2890
	Antares E.	47 1 48	2725	45 25 41	2708	43 49 12	2692	42 12 22	2675
	SATURN E.	59 0 25	2696	57 23 40	2680	55 46 33	2663	54 9 4	2646
	$\alpha$ Aquilæ E.	100 25 7	3214	98 59 14	3192	97 32 55	3172	96 6 12	3152
19	Regulus W.	65 54 1	2596	67 33 1	2578	69 12 26	2560	70 52 16	2541
	MARS W.	62 33 37	2794	64 8 13	2774	65 43 15	2755	67 18 42	2736
	SATURN E.	45 55 52	2561	44 16 3	2543	42 35 50	2526	40 55 13	2509
	$\alpha$ Aquilæ E.	88 46 47	3060	87 17 48	3043	85 48 28	3027	84 18 49	3012
20	Regulus W.	79 17 49	2450	81 0 12	2433	82 43 0	2415	84 26 13	2398
	MARS W.	75 22 20	2640	77 0 20	2621	78 38 46	2603	80 17 37	2585
	Spica W.	25 14 51	2460	26 57 0	2441	28 39 37	2420	30 22 43	2401
	$\alpha$ Aquilæ E.	76 46 10	2949	75 14 53	2940	73 43 25	2931	72 11 46	2923
	Fomalhaut E.	102 25 34	2912	100 53 30	2889	99 20 57	2866	97 47 55	2845
21	Regulus W.	93 8 28	2314	94 54 7	2299	96 40 8	2283	98 26 32	2268
	MARS W.	88 37 58	2498	90 19 14	2482	92 0 53	2466	93 42 54	2450
	Spica W.	39 4 58	2311	40 50 42	2294	42 36 50	2278	44 23 22	2262
	JUPITER W.	31 24 15	2372	33 8 30	2349	34 53 18	2327	36 38 38	2307
	$\alpha$ Aquilæ E.	64 32 1	2915	63 0 1	2919	61 28 6	2926	59 56 20	2935
	Fomalhaut E.	89 56 20	2754	88 20 52	2740	86 45 5	2725	85 8 59	2713

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
14	SUN	W.	74 25 30	3402	75 47 44	3396	77 10 5	3389	78 32 34	3382
	Pollux	W.	47 32 17	3132	48 59 48	3121	50 27 32	3111	51 55 28	3101
	Spica	E.	44 26 2	3052	42 56 54	3047	41 27 39	3041	39 58 17	3035
	JUPITER	E.	52 51 5	3064	51 22 11	3059	49 53 11	3055	48 24 6	3050
	Antares	E.	89 57 42	3046	88 28 26	3039	86 59 2	3034	85 29 31	3026
	SATURN	E.	102 12 43	3018	100 42 53	3012	99 12 55	3005	97 42 49	2999
15	SUN	W.	85 27 16	3338	86 50 44	3327	88 14 24	3317	89 38 16	3305
	Pollux	W.	59 18 15	3048	60 47 28	3036	62 16 56	3025	63 46 38	3013
	Spica	E.	32 29 29	3001	30 59 17	2993	29 28 55	2985	27 58 23	2977
	JUPITER	E.	40 57 7	3023	39 27 23	3018	37 57 32	3012	36 27 34	3005
	Antares	E.	77 59 37	2986	76 29 7	2977	74 58 25	2967	73 27 31	2957
	SATURN	E.	90 10 4	2958	88 38 59	2950	87 7 43	2939	85 36 14	2929
16	SUN	W.	96 41 7	3242	98 6 27	3228	99 32 3	3214	100 57 56	3198
	Pollux	W.	71 18 59	2949	72 50 16	2935	74 21 51	2920	75 53 44	2906
	Regulus	W.	34 16 39	2914	35 48 2	2907	37 19 46	2911	38 51 51	2895
	MARS	W.	32 25 51	3171	33 52 35	3151	35 19 43	3133	36 47 13	3114
	Antares	E.	65 49 35	2899	64 17 15	2886	62 44 38	2873	61 11 45	2859
	SATURN	E.	77 55 23	2872	76 22 28	2859	74 49 16	2845	73 15 47	2832
17	SUN	W.	108 11 56	3119	109 39 42	3102	111 7 49	3085	112 36 17	3067
	Pollux	W.	83 37 50	2831	85 11 38	2815	86 45 47	2798	88 20 17	2782
	Regulus	W.	46 37 36	2811	48 11 50	2793	49 46 27	2776	51 21 26	2759
	MARS	W.	44 10 21	3022	45 40 6	3003	47 10 15	2985	48 40 47	2966
	Antares	E.	53 22 48	2788	51 48 4	2772	50 12 59	2756	48 37 34	2741
	SATURN	E.	65 23 52	2760	63 48 31	2744	62 12 50	2729	60 36 48	2713
18	Pollux	W.	96 18 14	2698	97 54 56	2681	99 32 1	2664	101 9 29	2646
	Regulus	W.	59 22 10	2669	60 59 31	2652	62 37 16	2633	64 15 26	2615
	MARS	W.	56 19 23	2871	57 52 19	2852	59 25 40	2832	60 59 26	2813
	Antares	E.	40 35 9	2659	38 57 34	2642	37 19 36	2626	35 41 16	2609
	SATURN	E.	52 31 12	2629	50 52 57	2612	49 14 19	2595	47 35 17	2578
	α Aquilæ	E.	94 39 5	3133	93 11 35	3113	91 43 41	3095	90 15 25	3077
19	Regulus	W.	72 32 32	2523	74 13 13	2504	75 54 20	2487	77 35 52	2469
	MARS	W.	68 54 34	2716	70 30 52	2697	72 7 36	2678	73 44 45	2659
	SATURN	E.	39 14 12	2492	37 32 47	2475	35 50 58	2458	34 8 45	2441
	α Aquilæ	E.	82 48 51	2997	81 18 35	2984	79 48 2	2971	78 17 13	2950
20	Regulus	W.	86 9 51	2380	87 53 54	2364	89 38 21	2346	91 23 13	2331
	MARS	W.	81 56 52	2567	83 36 32	2549	85 16 37	2532	86 57 6	2515
	Spica	W.	32 6 16	2382	33 50 17	2363	35 34 45	2345	37 19 39	2328
	α Aquilæ	E.	70 39 59	2919	69 8 4	2916	67 36 5	2913	66 4 3	2913
	Fomalhaut	E.	96 14 26	2825	94 40 30	2806	93 6 10	2788	91 31 26	2771
21	Regulus	W.	100 13 18	2254	102 0 25	2240	103 47 53	2227	105 35 41	2213
	MARS	W.	95 25 17	2435	97 8 2	2421	98 51 7	2407	100 34 32	2393
	Spica	W.	46 10 18	2247	47 57 36	2232	49 45 16	2218	51 33 17	2204
	JUPITER	W.	38 24 27	2288	40 10 44	2270	41 57 28	2253	43 44 37	2237
	α Aquilæ	E.	58 24 45	2947	56 53 26	2932	55 22 26	2918	53 51 50	2905
	Fomalhaut	E.	83 32 37	2701	81 55 59	2692	80 19 8	2683	78 42 5	2675

## GREENWICH MEAN TIME.

## LUNAR DISTANCES

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
22	MARS W.	102 18 17	2380	104 2 21	2368	105 46 42	2356	107 31 20	2344
	Spica W.	53 21 39	2190	55 10 21	2178	56 59 21	2166	58 48 40	2154
	JUPITER W.	45 32 10	2221	47 20 6	2206	49 8 25	2192	50 57 4	2179
	Fomalhaut E.	77 4 52	2669	75 27 31	2666	73 50 5	2663	72 12 36	2662
	α Pegasi E.	96 19 32	2317	94 33 58	2305	92 48 6	2293	91 1 56	2281
23	Spica W.	67 59 21	2106	69 50 11	2098	71 41 14	2090	73 32 28	2084
	JUPITER W.	60 4 53	2125	61 55 14	2116	63 45 48	2109	65 36 34	2101
	Fomalhaut E.	64 5 44	2689	62 28 49	2701	60 52 10	2716	59 15 52	2735
	α Pegasi E.	82 7 17	2237	80 19 45	2231	78 32 3	2225	76 44 13	2221
24	Spica W.	82 50 48	2061	84 42 47	2059	86 34 50	2057	88 26 55	2056
	JUPITER W.	74 52 45	2077	76 44 19	2074	78 35 58	2072	80 27 40	2071
	Antares W.	37 19 6	2068	39 10 54	2064	41 2 48	2062	42 54 46	2061
	Fomalhaut E.	51 22 4	2886	49 49 27	2931	48 17 47	2982	46 47 12	3040
	α Pegasi E.	67 44 0	2215	65 55 55	2218	64 7 54	2221	62 19 58	2227
25	JUPITER W.	89 46 15	2075	91 37 52	2079	93 29 24	2082	95 20 51	2086
	Antares W.	52 14 52	2062	54 6 49	2064	55 58 43	2068	57 50 31	2072
	SATURN W.	40 45 19	2043	42 37 46	2046	44 30 9	2048	46 22 28	2052
	α Pegasi E.	53 22 50	2272	51 36 10	2287	49 49 51	2303	48 3 56	2322
	α Arietis E.	95 32 15	2077	93 40 40	2080	91 49 10	2083	89 57 45	2087
26	Antares W.	67 7 48	2099	68 58 48	2107	70 49 37	2115	72 40 14	2122
	SATURN W.	55 42 19	2079	57 33 50	2086	59 25 11	2094	61 16 20	2102
	α Arietis E.	80 42 31	2116	78 51 57	2124	77 1 34	2132	75 11 24	2141
27	Antares W.	81 50 1	2170	83 39 14	2180	85 28 11	2191	87 16 52	2202
	SATURN W.	70 28 45	2149	72 18 30	2159	74 7 59	2170	75 57 12	2182
	α Arietis E.	66 4 5	2191	64 15 24	2203	62 27 1	2215	60 38 56	2227
	Aldebaran E.	98 58 52	2202	97 10 27	2212	95 22 18	2223	93 34 24	2234
	VENUS E.	104 4 12	2544	102 24 0	2555	100 44 3	2567	99 4 23	2579
28	SATURN W.	84 58 54	2241	86 46 20	2253	88 33 28	2266	90 20 17	2279
	α Aquilæ W.	47 58 55	3203	49 25 1	3166	50 51 51	3134	52 19 19	3107
	α Arietis E.	51 43 14	2294	49 57 6	2309	48 11 19	2324	46 25 54	2339
	Aldebaran E.	84 39 13	2294	82 53 5	2307	81 7 16	2320	79 21 46	2334
	VENUS E.	90 50 19	2644	89 12 24	2658	87 34 48	2672	85 57 30	2686
	SUN E.	112 9 41	2557	110 29 47	2572	108 50 12	2585	107 10 56	2599
29	SATURN W.	99 9 34	2345	100 54 28	2359	102 39 2	2372	104 23 17	2386
	α Aquilæ W.	59 43 22	3025	61 13 4	3017	62 42 56	3020	64 12 56	3005
	α Arietis E.	37 44 37	2424	36 1 36	2442	34 19 1	2461	32 36 53	2482
	Aldebaran E.	70 39 14	2405	68 55 44	2417	67 12 34	2432	65 29 45	2447
	VENUS E.	77 55 46	2758	76 20 23	2772	74 45 19	2787	73 10 34	2801
	SUN E.	98 59 22	2669	97 22 1	2684	95 44 59	2698	94 8 17	2713
30	α Aquilæ W.	71 43 43	3005	73 13 49	3009	74 43 51	3014	76 13 47	3020
	Fomalhaut W.	47 4 27	3391	48 26 54	3357	49 50 0	3327	51 13 40	3301
	Aldebaran E.	57 0 52	2521	55 20 8	2537	53 39 46	2552	51 59 45	2567
	VENUS E.	65 21 34	2874	63 48 42	2889	62 16 9	2903	60 43 54	2917
	SUN E.	86 9 31	2784	84 34 42	2798	83 0 12	2812	81 26 0	2826

GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	MARS	W.	109 16 15	2334	111 1 25	2324	112 46 49	2315	114 32 26	2307
	Spica	W.	60 38 17	2143	62 28 10	2133	64 18 19	2123	66 8 43	2114
	JUPITER	W.	52 46 3	2167	54 35 20	2155	56 24 55	2145	58 14 46	2134
	Fomalhaut	E.	70 35 5	2663	68 57 36	2666	67 20 11	2672	65 42 53	2678
	α Pegasi	E.	89 15 29	2270	87 28 46	2261	85 41 49	2252	83 54 39	2244
23	Spica	W.	75 23 52	2078	77 15 25	2073	79 7 6	2068	80 58 54	2064
	JUPITER	W.	67 27 31	2095	69 18 38	2090	71 9 53	2085	73 1 16	2081
	Fomalhaut	E.	57 39 59	2757	56 4 35	2782	54 29 44	2812	52 55 32	2846
	α Pegasi	E.	74 56 17	2218	73 8 16	2216	71 20 12	2214	69 32 6	2214
	24	Spica	W.	90 19 2	2055	92 11 10	2056	94 3 17	2057	95 55 23
JUPITER		W.	82 19 24	2071	84 11 8	2071	86 2 52	2072	87 54 35	2073
Antares		W.	44 46 46	2059	46 38 48	2059	48 30 50	2059	50 22 52	2061
Fomalhaut		E.	45 17 49	3106	43 49 47	3182	42 23 16	3263	40 58 27	3365
α Pegasi		E.	60 32 10	2233	58 44 31	2240	56 57 3	2249	55 9 49	2260
25	JUPITER	W.	97 12 11	2091	99 3 24	2097	100 54 28	2103	102 45 23	2110
	Antares	W.	59 42 14	2076	61 33 50	2081	63 25 18	2086	65 16 38	2093
	SATURN	W.	48 14 41	2056	50 6 48	2061	51 58 47	2066	53 50 38	2073
	α Pegasi	E.	46 18 28	2343	44 33 31	2366	42 49 8	2394	41 5 24	2424
	α Arietis	E.	88 6 26	2092	86 15 14	2098	84 24 11	2103	82 33 16	2109
26	Antares	W.	74 30 39	2131	76 20 51	2140	78 10 49	2149	80 0 33	2160
	SATURN	W.	63 7 16	2111	64 57 59	2119	66 48 29	2129	68 38 44	2138
	α Arietis	E.	73 21 27	2150	71 31 44	2159	69 42 15	2170	67 53 2	2180
27	Antares	W.	89 5 16	2214	90 53 23	2226	92 41 12	2238	94 28 43	2251
	SATURN	W.	77 46 7	2193	79 34 45	2204	81 23 6	2216	83 11 9	2229
	α Arietis	E.	58 51 9	2240	57 3 41	2253	55 16 32	2266	53 29 43	2280
	Aldebaran	E.	91 46 47	2245	89 59 27	2257	88 12 24	2269	86 25 39	2282
	VENUS	E.	97 24 59	2591	95 45 52	2604	94 7 3	2618	92 28 32	2631
28	SATURN	W.	92 6 47	2292	93 52 58	2306	95 38 49	2319	97 24 21	2332
	α Aquilæ	W.	53 47 20	3084	55 15 49	3065	56 44 41	3049	58 13 53	3035
	α Arietis	E.	44 40 52	2355	42 56 12	2371	41 11 56	2388	39 28 4	2405
	Aldebaran	E.	77 36 36	2348	75 51 46	2361	74 7 15	2375	72 23 4	2389
	VENUS	E.	84 20 31	2700	82 43 51	2714	81 7 30	2729	79 31 28	2744
	SUN	E.	105 31 59	2612	103 53 21	2626	102 15 2	2640	100 37 2	2655
29	SATURN	W.	106 7 12	2398	107 50 49	2412	109 34 6	2426	111 17 4	2439
	α Aquilæ	W.	65 43 2	3002	67 13 12	3001	68 43 23	3001	70 13 34	3003
	α Arietis	E.	30 55 14	2503	29 14 5	2526	27 33 28	2551	25 53 26	2572
	Aldebaran	E.	63 47 17	2462	62 5 10	2476	60 23 23	2491	58 41 57	2506
	VENUS	E.	71 36 8	2816	70 2 1	2831	68 28 13	2845	66 54 44	2860
	SUN	E.	92 31 54	2727	90 55 50	2741	89 20 5	2756	87 44 39	2769
30	α Aquilæ	W.	77 43 35	3026	79 13 16	3033	80 42 48	3040	82 12 11	3049
	Fomalhaut	W.	52 37 50	2379	54 2 26	2360	55 27 24	2344	56 52 41	2320
	Aldebaran	E.	50 20 5	2583	48 40 47	2599	47 1 51	2615	45 23 17	2632
	VENUS	E.	59 11 57	2931	57 40 18	2945	56 8 56	2959	54 37 52	2973
	SUN	E.	79 52 6	2840	78 18 30	2854	76 45 12	2867	75 12 11	2881



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Sat.	1	6 40 51.34	10.342	N.23 7 11.6	-10.09	15 46.14	68.78	3 33.48	0.484
SUN.	2	6 44 59.42	10.331	23 2 57.2	11.10	15 46.13	68.74	3 44.97	0.474
Mon.	3	6 49 7.24	10.320	22 58 18.5	12.11	15 46.12	68.70	3 56.20	0.462
Tues.	4	6 53 14.78	10.308	22 53 15.8	-13.11	15 46.12	68.66	4 7.16	0.450
Wed.	5	6 57 22.02	10.295	22 47 49.2	14.10	15 46.12	68.61	4 17.81	0.437
Thur.	6	7 1 28.94	10.281	22 41 58.7	15.09	15 46.13	68.56	4 28.14	0.423
Frid.	7	7 5 35.50	10.266	22 35 44.5	-16.07	15 46.14	68.51	4 38.12	0.408
Sat.	8	7 9 41.69	10.250	22 29 6.9	17.05	15 46.16	68.46	4 47.73	0.392
SUN.	9	7 13 47.48	10.233	22 22 5.9	18.02	15 46.19	68.40	4 56.94	0.375
Mon.	10	7 17 52.86	10.215	22 14 41.8	-18.98	15 46.22	68.34	5 5.73	0.357
Tues.	11	7 21 57.80	10.196	22 6 54.7	19.93	15 46.26	68.28	5 14.09	0.339
Wed.	12	7 26 2.29	10.177	21 58 44.8	20.87	15 46.30	68.22	5 22.00	0.320
Thur.	13	7 30 6.29	10.157	21 50 12.4	-21.81	15 46.35	68.16	5 29.43	0.299
Frid.	14	7 34 9.81	10.136	21 41 17.7	22.74	15 46.40	68.09	5 36.37	0.278
Sat.	15	7 38 12.82	10.114	21 32 0.8	23.66	15 46.46	68.02	5 42.80	0.257
SUN.	16	7 42 15.31	10.092	21 22 21.9	-24.57	15 46.52	67.95	5 48.72	0.235
Mon.	17	7 46 17.26	10.070	21 12 21.4	25.47	15 46.59	67.88	5 54.10	0.213
Tues.	18	7 50 18.67	10.047	21 1 59.3	26.36	15 46.66	67.81	5 58.94	0.190
Wed.	19	7 54 19.53	10.024	20 51 16.0	-27.24	15 46.73	67.73	6 3.23	0.167
Thur.	20	7 58 19.83	10.001	20 40 11.6	28.11	15 46.81	67.65	6 6.96	0.144
Frid.	21	8 2 19.56	9.977	20 28 46.3	28.98	15 46.89	67.57	6 10.13	0.120
Sat.	22	8 6 18.73	9.953	20 17 0.5	-29.83	15 46.97	67.49	6 12.73	0.096
SUN.	23	8 10 17.32	9.929	20 4 54.3	30.67	15 47.05	67.41	6 14.76	0.072
Mon.	24	8 14 15.33	9.905	19 52 28.0	31.51	15 47.14	67.33	6 16.21	0.048
Tues.	25	8 18 12.77	9.881	19 39 41.8	-32.33	15 47.24	67.24	6 17.09	0.024
Wed.	26	8 22 9.62	9.857	19 26 35.9	33.14	15 47.33	67.16	6 17.38	0.000
Thur.	27	8 26 5.89	9.832	19 13 10.6	33.95	15 47.43	67.07	6 17.10	0.024
Frid.	28	8 30 1.58	9.808	18 59 26.2	-34.75	15 47.53	66.99	6 16.23	0.048
Sat.	29	8 33 56.68	9.784	18 45 22.9	35.53	15 47.63	66.90	6 14.78	0.073
SUN.	30	8 37 51.19	9.760	18 31 1.0	36.30	15 47.74	66.82	6 12.74	0.097
Mon.	31	8 41 45.12	9.735	18 16 20.8	37.05	15 47.86	66.73	6 10.12	0.121
Tues.	32	8 45 38.46	9.710	N.18 1 22.5	-37.80	15 47.98	66.65	6 6.91	0.146

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Sat.	1	6 40 50.73	10.340	N.23 7 12.2	-10.09	3 33.45	0.484	6 37 17.27
SUN.	2	6 44 58.77	10.330	23 2 57.9	11.10	3 44.94	0.473	6 41 13.83
Mon.	3	6 49 6.56	10.319	22 58 19.3	12.11	3 56.17	0.462	6 45 10.39
Tues.	4	6 53 14.08	10.307	22 53 16.7	-13.11	4 7.13	0.450	6 49 6.95
Wed.	5	6 57 21.29	10.294	22 47 50.1	14.10	4 17.78	0.437	6 53 3.50
Thur.	6	7 1 28.17	10.280	22 41 59.8	15.09	4 28.11	0.423	6 57 0.06
Frid.	7	7 5 34.71	10.265	22 35 45.7	-16.07	4 38.09	0.408	7 0 56.62
Sat.	8	7 9 40.87	10.249	22 29 8.2	17.05	4 47.69	0.392	7 4 53.18
SUN.	9	7 13 46.64	10.232	22 22 7.3	18.02	4 56.90	0.375	7 8 49.74
Mon.	10	7 17 52.00	10.214	22 14 43.4	-18.98	5 5.71	0.357	7 12 46.29
Tues.	11	7 21 56.92	10.196	22 6 56.4	19.93	5 14.07	0.339	7 16 42.85
Wed.	12	7 26 1.38	10.176	21 58 46.7	20.87	5 21.97	0.319	7 20 39.41
Thur.	13	7 30 5.37	10.156	21 50 14.4	-21.81	5 29.40	0.299	7 24 35.96
Frid.	14	7 34 8.86	10.135	21 41 19.7	22.74	5 36.34	0.278	7 28 32.52
Sat.	15	7 38 11.86	10.114	21 32 3.0	23.66	5 42.78	0.257	7 32 29.08
SUN.	16	7 42 14.33	10.092	21 22 24.2	-24.57	5 48.69	0.235	7 36 25.64
Mon.	17	7 46 16.27	10.070	21 12 23.8	25.47	5 54.08	0.213	7 40 22.19
Tues.	18	7 50 17.67	10.047	21 2 1.9	26.36	5 58.92	0.190	7 44 18.75
Wed.	19	7 54 18.52	10.024	20 51 18.7	-27.24	6 3.21	0.167	7 48 15.31
Thur.	20	7 58 18.81	10.001	20 40 14.4	28.11	6 6.95	0.144	7 52 11.86
Frid.	21	8 2 18.54	9.977	20 28 49.3	28.98	6 10.12	0.120	7 56 8.42
Sat.	22	8 6 17.70	9.953	20 17 3.6	-29.83	6 12.72	0.097	8 0 4.98
SUN.	23	8 10 16.28	9.929	20 4 57.5	30.67	6 14.75	0.073	8 4 1.53
Mon.	24	8 14 14.29	9.905	19 52 31.2	31.51	6 16.20	0.049	8 7 58.09
Tues.	25	8 18 11.73	9.881	19 39 45.1	-32.33	6 17.08	0.025	8 11 54.65
Wed.	26	8 22 8.58	9.857	19 26 39.3	33.14	6 17.38	0.001	8 15 51.20
Thur.	27	8 26 4.86	9.833	19 13 14.1	33.95	6 17.10	0.024	8 19 47.76
Frid.	28	8 30 0.55	9.809	18 59 29.7	-34.75	6 16.24	0.048	8 23 44.32
Sat.	29	8 33 55.66	9.784	18 45 26.5	35.53	6 14.79	0.073	8 27 40.87
SUN.	30	8 37 50.18	9.760	18 31 4.7	36.30	6 12.75	0.097	8 31 37.43
Mon.	31	8 41 44.12	9.735	18 16 24.5	37.05	6 10.13	0.121	8 35 33.98
Tues.	32	8 45 37.47	9.711	N.18 1 26.3	-37.80	6 6.93	0.146	8 39 30.54

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 9°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	182	99 23 20.6	22 37.8	143.00	+ 0.37	0.0072198	+ 2.8	h m s 17 19 51.90
2	183	100 20 32.8	19 49.9	143.01	0.30	0.0072254	1.9	17 15 55.99
3	184	101 17 45.3	17 2.2	143.02	0.22	0.0072290	+ 1.0	17 12 0.08
4	185	102 14 58.0	14 14.7	143.03	+ 0.11	0.0072302	0.0	17 8 4.17
5	186	103 12 10.8	11 27.3	143.04	— 0.01	0.0072288	— 1.1	17 4 8.26
6	187	104 9 24.0	8 40.4	143.05	0.14	0.0072248	2.2	17 0 12.34
7	188	105 6 37.3	5 53.5	143.06	— 0.28	0.0072182	— 3.3	16 56 16.43
8	189	106 3 50.7	3 6.7	143.07	0.41	0.0072090	4.4	16 52 20.52
9	190	107 1 4.3	0 20.2	143.07	0.53	0.0071971	5.5	16 48 24.61
10	191	107 58 18.1	57 33.8	143.08	— 0.62	0.0071826	— 6.6	16 44 28.70
11	192	108 55 31.9	54 47.4	143.08	0.70	0.0071655	7.6	16 40 32.79
12	193	109 52 45.8	52 1.2	143.08	0.74	0.0071459	8.6	16 36 36.88
13	194	110 49 59.7	49 14.9	143.08	— 0.76	0.0071240	— 9.6	16 32 40.96
14	195	111 47 13.7	46 28.7	143.09	0.74	0.0070998	10.5	16 28 45.05
15	196	112 44 27.8	43 42.6	143.09	0.70	0.0070734	11.4	16 24 49.14
16	197	113 41 42.0	40 56.7	143.09	— 0.64	0.0070451	— 12.2	16 20 53.23
17	198	114 38 56.3	38 10.8	143.10	0.54	0.0070149	13.0	16 16 57.32
18	199	115 36 10.9	35 25.2	143.11	0.42	0.0069828	13.7	16 13 1.41
19	200	116 33 25.6	32 39.8	143.12	— 0.30	0.0069491	— 14.4	16 9 5.50
20	201	117 30 40.8	29 54.8	143.14	0.17	0.0069139	15.0	16 5 9.58
21	202	118 27 56.2	27 10.1	143.16	— 0.04	0.0068774	15.5	16 1 13.67
22	203	119 25 12.3	24 26.0	143.18	+ 0.09	0.0068393	— 16.1	15 57 17.76
23	204	120 22 28.9	21 42.4	143.21	0.20	0.0068000	16.7	15 53 21.85
24	205	121 19 46.2	18 59.5	143.24	0.28	0.0067593	17.2	15 49 25.94
25	206	122 17 4.2	16 17.4	143.27	+ 0.35	0.0067173	— 17.8	15 45 30.03
26	207	123 14 23.1	13 36.2	143.31	0.38	0.0066739	18.4	15 41 34.12
27	208	124 11 43.0	10 55.9	143.35	0.39	0.0066290	19.1	15 37 38.21
28	209	125 9 3.8	8 16.6	143.39	+ 0.36	0.0065824	— 19.8	15 33 42.30
29	210	126 6 25.7	5 38.3	143.43	0.30	0.0065342	20.5	15 29 46.39
30	211	127 3 48.7	3 1.2	143.48	0.23	0.0064842	21.2	15 25 50.48
31	212	128 1 12.8	0 25.1	143.53	+ 0.12	0.0064325	22.0	15 21 54.57
32	213	128 58 38.0	57 50.2	143.58	— 0.01	0.0063786	— 22.9	15 17 58.66

NOTE.—The numbers in column  $\lambda$  correspond to the true equinox of the date; in column  $\lambda'$  to the mean equinox of January 0<sup>th</sup>.

Diff. for 1 Hour.  
—9<sup>h</sup>.8296  
(Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	15 40.7	15 35.3	57 25.9	-1.70	57 5.8	-1.64	19 30.4	2.10	23.2	
2	15 30.0	15 25.0	56 46.5	1.57	56 28.2	1.49	20 21.3	2.14	24.2	
3	15 20.3	15 15.8	56 10.8	1.40	55 54.4	1.32	21 13.2	2.17	25.2	
4	15 11.6	15 7.7	55 39.0	-1.23	55 24.7	-1.15	22 5.4	2.17	26.2	
5	15 4.1	15 0.8	55 11.4	1.07	54 59.1	0.98	22 56.9	2.12	27.2	
6	14 57.7	14 54.9	54 47.8	0.90	54 37.6	0.81	23 46.9	2.04	28.2	
7	14 52.4	14 50.2	54 28.4	-0.72	54 20.3	-0.62	6		29.2	
8	14 48.3	14 46.8	54 13.4	0.53	54 7.7	0.42	0 34.6	1.94	0.6	
9	14 45.6	14 44.8	54 3.4	0.30	54 0.5	-0.18	1 20.0	1.84	1.6	
10	14 44.4	14 44.5	53 59.1	-0.05	53 59.3	+0.10	2 3.3	1.76	2.6	
11	14 45.1	14 46.1	54 1.4	+0.25	54 5.3	0.41	2 44.9	1.71	3.6	
12	14 47.7	14 49.9	54 11.2	0.58	54 19.3	0.76	3 25.7	1.69	4.6	
13	14 52.7	14 56.1	54 29.5	+0.95	54 42.0	+1.14	4 6.5	1.72	5.6	
14	15 0.1	15 4.8	54 56.8	1.33	55 13.9	1.52	4 48.4	1.78	6.6	
15	15 10.0	15 15.9	55 33.2	1.70	55 54.8	1.88	5 32.3	1.89	7.6	
16	15 22.3	15 29.2	56 18.3	+2.03	56 43.6	+2.18	6 19.2	2.04	8.6	
17	15 36.5	15 44.2	57 10.5	2.29	57 38.5	2.36	7 10.2	2.21	9.6	
18	15 52.0	15 59.8	58 7.2	2.40	58 36.1	2.39	8 5.5	2.40	10.6	
19	16 7.6	16 15.1	59 4.6	+2.33	59 32.1	+2.21	9 4.9	2.54	11.6	
20	16 22.1	16 28.4	59 57.7	2.03	60 20.9	1.80	10 6.8	2.60	12.6	
21	16 33.8	16 38.2	60 40.9	1.51	60 57.1	1.18	11 9.1	2.57	13.6	
22	16 41.5	16 43.5	61 9.0	+0.80	61 16.3	+0.40	12 9.8	2.47	14.6	
23	16 44.1	16 43.4	61 18.6	-0.01	61 16.0	-0.41	13 7.6	2.34	15.6	
24	16 41.4	16 38.2	61 8.7	0.80	60 56.9	1.15	14 2.4	2.23	16.6	
25	16 33.9	16 28.6	60 41.1	-1.46	60 21.9	-1.72	14 54.8	2.15	17.6	
26	16 22.7	16 16.1	59 59.9	1.92	59 35.8	2.07	15 45.8	2.11	18.6	
27	16 9.1	16 1.9	59 10.2	2.16	58 43.8	2.21	16 36.2	2.10	19.6	
28	15 54.7	15 47.5	58 17.2	-2.21	57 50.8	-2.17	17 26.8	2.12	20.6	
29	15 40.5	15 33.8	57 25.1	2.10	57 0.4	2.01	18 18.1	2.15	21.6	
30	15 27.4	15 21.3	56 36.9	1.90	56 14.9	1.77	19 10.0	2.17	22.6	
31	15 15.8	15 10.7	55 54.5	1.63	55 35.7	1.49	20 2.0	2.16	23.6	
32	15 6.1	15 1.9	55 18.7	-1.35	55 3.4	-1.20	20 53.6	2.12	24.6	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 1.					MONDAY 3.				
0	h m s		N. 14 22 38.2	11.023	0	h m s		N. 21 21 14.2	6.157
1	1 28 29.43	2.1581	14 33 37.1	10.940	1	3 14 4.27	2.2407	21 27 20.2	6.042
2	1 30 38.96	2.1597	14 44 31.0	10.855	2	3 16 18.76	2.2422	21 33 19.2	5.924
3	1 32 48.59	2.1612	14 55 19.7	10.769	3	3 18 33.33	2.2435	21 39 11.1	5.807
4	1 34 58.30	2.1627	15 6 3.3	10.682	4	3 20 47.98	2.2448	21 44 56.0	5.690
5	1 37 8.11	2.1643	15 16 41.6	10.595	5	3 23 2.71	2.2462	21 50 33.9	5.572
6	1 39 18.02	2.1660	15 27 14.7	10.507	6	3 25 17.52	2.2474	21 56 4.7	5.453
7	1 41 28.03	2.1676	15 37 42.4	10.418	7	3 27 32.40	2.2487	22 1 28.3	5.334
8	1 43 38.13	2.1692	15 48 4.8	10.327	8	3 29 47.36	2.2499	22 6 44.8	5.215
9	1 45 48.34	2.1709	15 58 21.7	10.237	9	3 32 2.39	2.2511	22 11 54.1	5.096
10	1 47 58.64	2.1726	16 8 33.2	10.145	10	3 34 17.49	2.2522	22 16 56.3	4.976
11	1 50 9.05	2.1743	16 18 39.1	10.052	11	3 36 32.66	2.2532	22 21 51.2	4.855
12	1 52 19.56	2.1761	16 28 39.5	9.960	12	3 38 47.88	2.2542	22 26 38.9	4.735
13	1 54 30.18	2.1779	16 38 34.3	9.867	13	3 41 3.17	2.2553	22 31 19.4	4.614
14	1 56 40.91	2.1797	16 48 23.5	9.772	14	3 43 18.52	2.2562	22 35 52.6	4.492
15	1 58 51.74	2.1813	16 58 6.9	9.676	15	3 45 33.92	2.2571	22 40 18.5	4.372
16	2 1 2.67	2.1832	17 7 44.6	9.580	16	3 47 49.37	2.2580	22 44 37.2	4.250
17	2 3 13.72	2.1851	17 17 16.5	9.483	17	3 50 4.88	2.2588	22 48 48.5	4.127
18	2 5 24.88	2.1868	17 26 42.6	9.386	18	3 52 20.43	2.2595	22 52 52.5	4.005
19	2 7 36.14	2.1887	17 36 2.8	9.287	19	3 54 36.02	2.2602	22 56 49.1	3.882
20	2 9 47.52	2.1905	17 45 17.1	9.189	20	3 56 51.65	2.2608	23 0 38.3	3.759
21	2 11 59.00	2.1923	17 54 25.5	9.089	21	3 59 7.32	2.2615	23 4 20.2	3.637
22	2 14 10.59	2.1942	18 3 27.8	8.988	22	4 1 23.03	2.2621	23 7 54.7	3.513
23	2 16 22.30	2.1960	N. 18 12 24.1	8.887	23	4 3 38.77	2.2626	N. 23 11 21.8	3.390
24	2 18 34.11	2.1978				4 5 54.54	2.2630		
SUNDAY 2.					TUESDAY 4.				
0	2 20 46.03	2.1997	N. 18 21 14.3	8.786	0	4 8 10.33	2.2633	N. 23 14 41.5	3.267
1	2 22 58.07	2.2016	18 29 58.4	8.684	1	4 10 26.14	2.2637	23 17 53.8	3.142
2	2 25 10.22	2.2033	18 38 36.4	8.581	2	4 12 41.97	2.2639	23 20 58.6	3.018
3	2 27 22.47	2.2052	18 47 8.1	8.477	3	4 14 57.81	2.2641	23 23 56.0	2.895
4	2 29 34.84	2.2071	18 55 33.6	8.372	4	4 17 13.66	2.2642	23 26 46.0	2.771
5	2 31 47.32	2.2089	19 3 52.8	8.267	5	4 19 29.52	2.2643	23 29 28.5	2.647
6	2 33 59.91	2.2107	19 12 5.7	8.162	6	4 21 45.38	2.2643	23 32 3.6	2.522
7	2 36 12.60	2.2125	19 20 12.2	8.055	7	4 24 1.24	2.2643	23 34 31.2	2.397
8	2 38 25.41	2.2143	19 28 12.3	7.948	8	4 26 17.10	2.2642	23 36 51.3	2.272
9	2 40 38.32	2.2161	19 36 6.0	7.841	9	4 28 32.95	2.2641	23 39 3.9	2.148
10	2 42 51.34	2.2179	19 43 53.2	7.732	10	4 30 48.79	2.2638	23 41 9.1	2.024
11	2 45 4.47	2.2197	19 51 33.9	7.623	11	4 33 4.61	2.2635	23 43 6.8	1.899
12	2 47 17.70	2.2214	19 59 8.0	7.513	12	4 35 20.41	2.2632	23 44 57.0	1.775
13	2 49 31.04	2.2232	20 6 35.5	7.403	13	4 37 36.19	2.2628	23 46 39.8	1.651
14	2 51 44.48	2.2248	20 13 56.4	7.293	14	4 39 51.95	2.2623	23 48 15.1	1.526
15	2 53 58.02	2.2265	20 21 10.7	7.182	15	4 42 7.67	2.2617	23 49 42.9	1.401
16	2 56 11.66	2.2282	20 28 18.3	7.071	16	4 44 23.36	2.2612	23 51 3.2	1.277
17	2 58 25.41	2.2299	20 35 19.2	6.958	17	4 46 39.02	2.2606	23 52 16.1	1.153
18	3 0 39.25	2.2314	20 42 13.3	6.845	18	4 48 54.63	2.2598	23 53 21.6	1.029
19	3 2 53.18	2.2330	20 49 0.6	6.732	19	4 51 10.20	2.2591	23 54 19.6	0.904
20	3 5 7.21	2.2347	20 55 41.1	6.617	20	4 53 25.72	2.2582	23 55 10.1	0.780
21	3 7 21.34	2.2362	21 2 14.7	6.503	21	4 55 41.18	2.2572	23 55 53.2	0.656
22	3 9 35.56	2.2377	21 8 41.5	6.388	22	4 57 56.59	2.2563	23 56 28.8	0.532
23	3 11 49.87	2.2392	21 15 1.3	6.272	23	5 0 11.94	2.2552	23 56 57.0	0.408
24	3 14 4.27	2.2407	N. 21 21 14.2	6.157	24	5 2 27.22	2.2541	N. 23 57 17.8	0.285

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 5.					FRIDAY 7.				
0	5 2 27.22	2.2547	N.23 57 17.8	0.285	0	6 48 15.40	2.1350	N.21 54 55.0	5.800
1	5 4 42.43	2.2529	23 57 31.2	0.161	1	6 50 23.39	2.1314	21 49 40.0	5.301
2	5 6 57.57	2.2517	23 57 37.1	+ 0.037	2	6 52 31.17	2.1279	21 44 18.9	5.401
3	5 9 12.64	2.2505	23 57 35.7	- 0.085	3	6 54 38.74	2.1243	21 38 51.9	5.500
4	5 11 27.63	2.2491	23 57 26.9	0.207	4	6 56 46.09	2.1207	21 33 18.9	5.599
5	5 13 42.53	2.2477	23 57 10.8	0.330	5	6 58 53.22	2.1171	21 27 40.0	5.697
6	5 15 57.35	2.2462	23 56 47.3	0.452	6	7 1 0.14	2.1135	21 21 55.3	5.793
7	5 18 12.08	2.2447	23 56 16.5	0.574	7	7 3 6.84	2.1098	21 16 4.8	5.890
8	5 20 26.71	2.2430	23 55 38.4	0.696	8	7 5 13.32	2.1062	21 10 8.5	5.986
9	5 22 41.24	2.2413	23 54 53.0	0.817	9	7 7 19.58	2.1024	21 4 6.5	6.081
10	5 24 55.67	2.2396	23 54 0.3	0.939	10	7 9 25.61	2.0987	20 57 58.8	6.175
11	5 27 9.99	2.2377	23 53 0.3	1.060	11	7 11 31.42	2.0950	20 51 45.5	6.268
12	5 29 24.20	2.2359	23 51 53.1	1.180	12	7 13 37.01	2.0912	20 45 26.6	6.361
13	5 31 38.30	2.2340	23 50 38.7	1.300	13	7 15 42.37	2.0875	20 39 2.2	6.453
14	5 33 52.28	2.2320	23 49 17.1	1.420	14	7 17 47.51	2.0837	20 32 32.3	6.544
15	5 36 6.14	2.2300	23 47 48.3	1.540	15	7 19 52.42	2.0799	20 25 56.9	6.634
16	5 38 19.88	2.2279	23 46 12.3	1.659	16	7 21 57.10	2.0762	20 19 16.2	6.723
17	5 40 33.49	2.2257	23 44 29.2	1.777	17	7 24 1.56	2.0724	20 12 30.1	6.812
18	5 42 46.97	2.2235	23 42 39.1	1.895	18	7 26 5.79	2.0686	20 5 38.7	6.901
19	5 45 0.31	2.2212	23 40 41.8	2.013	19	7 28 9.79	2.0648	19 58 42.0	6.988
20	5 47 13.52	2.2190	23 38 37.5	2.130	20	7 30 13.56	2.0610	19 51 40.1	7.074
21	5 49 26.59	2.2166	23 36 26.2	2.247	21	7 32 17.11	2.0572	19 44 33.1	7.160
22	5 51 39.51	2.2141	23 34 7.8	2.364	22	7 34 20.43	2.0534	19 37 20.9	7.246
23	5 53 52.28	2.2117	N.23 31 42.5	2.480	23	7 36 23.52	2.0496	N.19 30 3.6	7.330
THURSDAY 6.					SATURDAY 8.				
0	5 56 4.91	2.2092	N.23 29 10.2	2.596	0	7 38 26.38	2.0457	N.19 22 41.3	7.413
1	5 58 17.38	2.2066	23 26 31.0	2.711	1	7 40 29.01	2.0420	19 15 14.0	7.496
2	6 0 29.70	2.2039	23 23 44.9	2.826	2	7 42 31.42	2.0382	19 7 41.8	7.577
3	6 2 41.85	2.2012	23 20 51.9	2.940	3	7 44 33.59	2.0343	19 0 4.7	7.658
4	6 4 53.84	2.1985	23 17 52.1	3.053	4	7 46 35.54	2.0306	18 52 22.8	7.739
5	6 7 5.67	2.1957	23 14 45.5	3.166	5	7 48 37.26	2.0268	18 44 36.0	7.819
6	6 9 17.33	2.1928	23 11 32.2	3.278	6	7 50 38.76	2.0231	18 36 44.5	7.897
7	6 11 28.81	2.1899	23 8 12.1	3.391	7	7 52 40.03	2.0193	18 28 48.3	7.975
8	6 13 40.12	2.1870	23 4 45.3	3.502	8	7 54 41.07	2.0155	18 20 47.5	8.052
9	6 15 51.25	2.1841	23 1 11.9	3.612	9	7 56 41.89	2.0117	18 12 42.0	8.129
10	6 18 2.21	2.1811	22 57 31.8	3.722	10	7 58 42.48	2.0080	18 4 32.0	8.205
11	6 20 12.98	2.1779	22 53 45.2	3.831	11	8 0 42.85	2.0042	17 56 17.4	8.279
12	6 22 23.56	2.1748	22 49 52.0	3.941	12	8 2 42.99	2.0005	17 47 58.5	8.352
13	6 24 33.96	2.1717	22 45 52.3	4.050	13	8 4 42.91	1.9968	17 39 35.1	8.426
14	6 26 44.17	2.1686	22 41 46.0	4.158	14	8 6 42.61	1.9932	17 31 7.4	8.498
15	6 28 54.19	2.1654	22 37 33.3	4.265	15	8 8 42.09	1.9895	17 22 35.3	8.571
16	6 31 4.02	2.1622	22 33 14.2	4.372	16	8 10 41.35	1.9858	17 13 58.9	8.642
17	6 33 13.65	2.1588	22 28 48.7	4.477	17	8 12 40.39	1.9822	17 5 18.3	8.712
18	6 35 23.08	2.1555	22 24 16.9	4.582	18	8 14 39.21	1.9786	16 56 33.5	8.781
19	6 37 32.31	2.1522	22 19 38.8	4.687	19	8 16 37.82	1.9750	16 47 44.6	8.849
20	6 39 41.34	2.1487	22 14 54.4	4.792	20	8 18 36.21	1.9714	16 38 51.6	8.917
21	6 41 50.16	2.1453	22 10 3.7	4.896	21	8 20 34.39	1.9679	16 29 54.5	8.984
22	6 43 58.78	2.1419	22 5 6.9	4.998	22	8 22 32.36	1.9643	16 20 53.5	9.050
23	6 46 7.19	2.1385	22 0 4.0	5.099	23	8 24 30.11	1.9608	16 11 48.5	9.116
24	6 48 15.40	2.1350	N.21 54 55.0	5.200	24	8 26 27.66	1.9574	N.16 2 39.6	9.181

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 9.					TUESDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	8 26 27.66	1.9574	N. 16 2 39.6	9.181	0	9 57 2.27	1.8325	N. 7 41 41.1	11.417
1	8 28 25.00	1.9539	15 53 26.8	9.245	1	9 58 52.17	1.8310	7 30 15.2	11.447
2	8 30 22.13	1.9504	15 44 10.2	9.307	2	10 0 41.99	1.8296	7 18 47.5	11.476
3	8 32 19.05	1.9471	15 34 49.9	9.370	3	10 2 31.72	1.8281	7 7 18.1	11.504
4	8 34 15.78	1.9437	15 25 25.8	9.432	4	10 4 21.36	1.8268	6 55 47.0	11.532
5	8 36 12.30	1.9403	15 15 58.1	9.493	5	10 6 10.93	1.8256	6 44 14.3	11.558
6	8 38 8.62	1.9370	15 6 26.7	9.553	6	10 8 0.43	1.8243	6 32 40.0	11.584
7	8 40 4.74	1.9337	14 56 51.7	9.612	7	10 9 49.85	1.8232	6 21 4.2	11.610
8	8 42 0.67	1.9305	14 47 13.2	9.671	8	10 11 39.21	1.8221	6 9 26.8	11.635
9	8 43 56.40	1.9272	14 37 31.2	9.729	9	10 13 28.50	1.8210	5 57 48.0	11.659
10	8 45 51.94	1.9241	14 27 45.7	9.786	10	10 15 17.73	1.8200	5 46 7.7	11.682
11	8 47 47.29	1.9208	14 17 56.9	9.842	11	10 17 6.90	1.8191	5 34 26.1	11.705
12	8 49 42.44	1.9177	14 8 4.7	9.897	12	10 18 56.02	1.8182	5 22 43.1	11.727
13	8 51 37.41	1.9147	13 58 9.2	9.952	13	10 20 45.08	1.8173	5 10 58.8	11.749
14	8 53 32.20	1.9116	13 48 10.4	10.006	14	10 22 34.09	1.8165	4 59 13.2	11.771
15	8 55 26.80	1.9086	13 38 8.5	10.059	15	10 24 23.06	1.8158	4 47 26.3	11.792
16	8 57 21.23	1.9057	13 28 3.3	10.112	16	10 26 11.99	1.8152	4 35 38.2	11.811
17	8 59 15.48	1.9027	13 17 55.0	10.163	17	10 28 0.88	1.8146	4 23 49.0	11.830
18	9 1 9.55	1.8997	13 7 43.7	10.214	18	10 29 49.74	1.8140	4 11 58.6	11.849
19	9 3 3.44	1.8968	12 57 29.3	10.265	19	10 31 38.56	1.8135	4 0 7.1	11.867
20	9 4 57.17	1.8940	12 47 11.9	10.314	20	10 33 27.36	1.8131	3 48 14.6	11.884
21	9 6 50.72	1.8912	12 36 51.6	10.363	21	10 35 16.13	1.8127	3 36 21.0	11.901
22	9 8 44.11	1.8884	12 26 28.3	10.412	22	10 37 4.89	1.8124	3 24 26.5	11.917
23	9 10 37.33	1.8857	N. 12 16 2.2	10.459	23	10 38 53.62	1.8122	N. 3 12 31.0	11.938
MONDAY 10.					WEDNESDAY 12.				
0	9 12 30.39	1.8830	N. 12 5 33.2	10.506	0	10 40 42.35	1.8121	N. 3 0 34.6	11.947
1	9 14 23.29	1.8804	11 55 1.5	10.552	1	10 42 31.07	1.8118	2 48 37.4	11.961
2	9 16 16.04	1.8778	11 44 27.0	10.597	2	10 44 19.77	1.8117	2 36 39.3	11.975
3	9 18 8.63	1.8752	11 33 49.8	10.642	3	10 46 8.48	1.8118	2 24 40.4	11.987
4	9 20 1.07	1.8727	11 23 10.0	10.685	4	10 47 57.19	1.8118	2 12 40.8	11.999
5	9 21 53.36	1.8703	11 12 27.6	10.728	5	10 49 45.90	1.8119	2 0 40.5	12.011
6	9 23 45.51	1.8679	11 1 42.6	10.772	6	10 51 34.62	1.8121	1 48 39.5	12.022
7	9 25 37.51	1.8655	10 50 55.0	10.813	7	10 53 23.35	1.8123	1 36 37.8	12.033
8	9 27 29.37	1.8632	10 40 5.0	10.853	8	10 55 12.10	1.8126	1 24 35.5	12.044
9	9 29 21.09	1.8609	10 29 12.6	10.894	9	10 57 0.86	1.8129	1 12 32.7	12.051
10	9 31 12.68	1.8587	10 18 17.7	10.934	10	10 58 49.65	1.8134	1 0 29.4	12.060
11	9 33 4.13	1.8564	10 7 20.5	10.972	11	11 0 38.47	1.8138	0 48 25.5	12.068
12	9 34 55.45	1.8543	9 56 21.0	11.011	12	11 2 27.31	1.8143	0 36 21.2	12.075
13	9 36 46.65	1.8522	9 45 19.2	11.048	13	11 4 16.19	1.8150	0 24 16.5	12.082
14	9 38 37.72	1.8502	9 34 15.2	11.085	14	11 6 5.11	1.8157	0 12 11.4	12.087
15	9 40 28.67	1.8482	9 23 9.0	11.122	15	11 7 54.07	1.8164	N. 0 0 6.0	12.093
16	9 42 19.50	1.8462	9 12 0.6	11.157	16	11 9 43.08	1.8172	S. 0 11 59.8	12.098
17	9 44 10.22	1.8443	9 0 50.1	11.192	17	11 11 32.14	1.8181	0 24 5.8	12.108
18	9 46 0.82	1.8425	8 49 37.6	11.226	18	11 13 21.25	1.8190	0 36 12.0	12.105
19	9 47 51.32	1.8407	8 38 23.0	11.260	19	11 15 10.42	1.8200	0 48 18.4	12.107
20	9 49 41.71	1.8390	8 27 6.4	11.292	20	11 16 59.65	1.8210	1 0 24.9	12.110
21	9 51 32.00	1.8372	8 15 47.9	11.324	21	11 18 48.94	1.8221	1 12 31.6	12.112
22	9 53 22.18	1.8356	8 4 27.5	11.356	22	11 20 38.30	1.8232	1 24 38.3	12.112
23	9 55 12.27	1.8341	7 53 5.2	11.387	23	11 22 27.73	1.8245	1 36 45.0	12.118
24	9 57 2.27	1.8325	N. 7 41 41.1	11.417	24	11 24 17.24	1.8258	S. 1 48 51.7	12.118

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 13.					SATURDAY 15.				
0	11 24 17.24	1.8258	S. 1 48 51.7	12.112	0	12 54 41.67	1.9669	S. 11 16 27.9	11.249
1	11 26 6.83	1.8272	2 0 58.4	12.111	1	12 56 39.82	1.9715	11 27 41.7	11.211
2	11 27 56.51	1.8287	2 13 5.0	12.109	2	12 58 38.25	1.9762	11 38 53.2	11.172
3	11 29 46.27	1.8302	2 25 11.5	12.107	3	13 0 36.96	1.9808	11 50 2.4	11.132
4	11 31 36.13	1.8317	2 37 17.8	12.103	4	13 2 35.95	1.9857	12 1 9.1	11.092
5	11 33 26.08	1.8333	2 49 23.9	12.099	5	13 4 35.24	1.9905	12 12 13.4	11.051
6	11 35 16.13	1.8351	3 1 29.7	12.095	6	13 6 34.81	1.9953	12 23 15.2	11.009
7	11 37 6.29	1.8368	3 13 35.3	12.090	7	13 8 34.68	2.0003	12 34 14.5	10.966
8	11 38 56.55	1.8387	3 25 40.5	12.084	8	13 10 34.85	2.0053	12 45 11.1	10.921
9	11 40 46.93	1.8406	3 37 45.4	12.078	9	13 12 35.32	2.0104	12 56 5.0	10.875
10	11 42 37.42	1.8425	3 49 49.9	12.071	10	13 14 36.10	2.0156	13 6 56.1	10.829
11	11 44 28.03	1.8445	4 1 53.9	12.062	11	13 16 37.19	2.0207	13 17 44.5	10.782
12	11 46 18.76	1.8466	4 13 57.3	12.053	12	13 18 38.59	2.0260	13 28 29.9	10.733
13	11 48 9.62	1.8488	4 26 0.2	12.044	13	13 20 40.31	2.0313	13 39 12.4	10.684
14	11 50 0.62	1.8511	4 38 2.6	12.035	14	13 22 42.35	2.0367	13 49 52.0	10.634
15	11 51 51.75	1.8533	4 50 4.4	12.024	15	13 24 44.72	2.0422	14 0 28.5	10.582
16	11 53 43.02	1.8557	5 2 5.5	12.012	16	13 26 47.42	2.0477	14 11 1.8	10.529
17	11 55 34.43	1.8581	5 14 5.9	12.001	17	13 28 50.45	2.0533	14 21 32.0	10.477
18	11 57 25.99	1.8606	5 26 5.6	11.988	18	13 30 53.82	2.0590	14 31 59.0	10.422
19	11 59 17.70	1.8632	5 38 4.5	11.975	19	13 32 57.53	2.0647	14 42 22.6	10.366
20	12 1 9.57	1.8658	5 50 2.6	11.962	20	13 35 1.58	2.0703	14 52 42.9	10.309
21	12 3 1.60	1.8685	6 1 59.9	11.947	21	13 37 5.97	2.0762	15 2 59.7	10.251
22	12 4 53.79	1.8712	6 13 56.2	11.931	22	13 39 10.72	2.0820	15 13 13.0	10.192
23	12 6 46.15	1.8741	S. 6 25 51.6	11.914	23	13 41 15.81	2.0879	S. 15 23 22.7	10.132
FRIDAY 14.					SUNDAY 16.				
0	12 8 38.68	1.8770	S. 6 37 45.9	11.897	0	13 43 21.27	2.0939	S. 15 33 28.8	10.071
1	12 10 31.39	1.8800	6 49 39.2	11.879	1	13 45 27.08	2.0993	15 43 31.2	10.008
2	12 12 24.28	1.8830	7 1 31.4	11.860	2	13 47 33.25	2.1059	15 53 29.8	9.945
3	12 14 17.35	1.8861	7 13 22.4	11.841	3	13 49 39.79	2.1120	16 3 24.6	9.881
4	12 16 10.61	1.8893	7 25 12.3	11.821	4	13 51 46.69	2.1181	16 13 15.5	9.815
5	12 18 4.07	1.8926	7 37 0.9	11.800	5	13 53 53.96	2.1243	16 23 2.4	9.747
6	12 19 57.72	1.8958	7 48 48.3	11.779	6	13 56 1.61	2.1306	16 32 45.2	9.679
7	12 21 51.57	1.8992	8 0 34.4	11.757	7	13 58 9.63	2.1368	16 42 23.9	9.609
8	12 23 45.63	1.9027	8 12 19.1	11.733	8	14 0 18.03	2.1432	16 51 58.3	9.538
9	12 25 39.89	1.9062	8 24 2.4	11.709	9	14 2 26.82	2.1497	17 1 28.5	9.467
10	12 27 34.37	1.9097	8 35 44.2	11.684	10	14 4 35.99	2.1560	17 10 54.4	9.395
11	12 29 29.06	1.9134	8 47 24.5	11.658	11	14 6 45.54	2.1624	17 20 15.9	9.320
12	12 31 23.98	1.9172	8 59 3.2	11.632	12	14 8 55.48	2.1689	17 29 32.8	9.244
13	12 33 19.12	1.9209	9 10 40.3	11.605	13	14 11 5.81	2.1755	17 38 45.2	9.168
14	12 35 14.49	1.9248	9 22 15.8	11.577	14	14 13 16.54	2.1821	17 47 53.0	9.090
15	12 37 10.10	1.9287	9 33 49.5	11.547	15	14 15 27.66	2.1887	17 56 56.0	9.010
16	12 39 5.94	1.9327	9 45 21.5	11.518	16	14 17 39.18	2.1953	18 5 54.2	8.930
17	12 41 2.02	1.9367	9 56 51.7	11.487	17	14 19 51.10	2.2020	18 14 47.6	8.848
18	12 42 58.35	1.9409	10 8 20.0	11.456	18	14 22 3.42	2.2087	18 23 36.0	8.765
19	12 44 54.93	1.9450	10 19 46.4	11.424	19	14 24 16.14	2.2154	18 32 19.4	8.681
20	12 46 51.75	1.9492	10 31 10.9	11.391	20	14 26 29.27	2.2222	18 40 57.7	8.595
21	12 48 48.84	1.9536	10 42 33.3	11.356	21	14 28 42.81	2.2290	18 49 30.8	8.508
22	12 50 46.18	1.9579	10 53 53.6	11.321	22	14 30 56.75	2.2358	18 57 58.7	8.420
23	12 52 43.79	1.9624	11 5 11.8	11.286	23	14 33 11.11	2.2427	19 6 21.2	8.330
24	12 54 41.67	1.9669	S. 11 16 27.9	11.249	24	14 35 25.87	2.2495	S. 19 14 38.3	8.239



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 17.					WEDNESDAY 19.				
0	h m s	"	S. ° ' "	"	0	h m s	"	S. ° ' "	"
1	14 35 25.87	2.2495	19 14 38.3	8.239	1	16 31 11.12	2.5593	23 39 29.3	2.286
2	14 37 41.05	2.2564	19 22 49.9	8.147	2	16 33 44.83	2.5642	23 41 41.8	2.131
3	14 39 56.64	2.2633	19 30 55.9	8.053	3	16 36 18.83	2.5691	23 43 45.0	1.976
4	14 42 12.65	2.2702	19 38 56.3	7.958	4	16 38 53.12	2.5739	23 45 38.9	1.819
5	14 44 29.07	2.2772	19 46 50.9	7.862	5	16 41 27.70	2.5787	23 47 23.3	1.661
6	14 46 45.91	2.2841	19 54 39.7	7.765	6	16 44 2.56	2.5833	23 48 58.2	1.502
7	14 49 3.16	2.2910	20 2 22.7	7.666	7	16 46 37.69	2.5877	23 50 23.5	1.342
8	14 51 20.83	2.2980	20 9 59.6	7.564	8	16 49 13.08	2.5920	23 51 39.2	1.182
9	14 53 38.92	2.3049	20 17 30.4	7.462	9	16 51 48.73	2.5968	23 52 45.3	1.021
10	14 55 57.42	2.3119	20 24 55.1	7.361	10	16 54 24.63	2.6003	23 53 41.7	0.859
11	14 58 16.35	2.3189	20 32 13.6	7.256	11	16 57 0.77	2.6043	23 54 28.4	0.696
12	15 0 35.69	2.3258	20 39 25.8	7.141	12	16 59 37.15	2.6082	23 55 5.2	0.532
13	15 2 55.44	2.3327	20 46 31.5	7.042	13	17 2 13.76	2.6120	23 55 32.2	0.367
14	15 5 15.62	2.3397	20 53 30.8	6.933	14	17 4 50.59	2.6156	23 55 49.3	0.202
15	15 7 36.21	2.3467	21 0 23.5	6.823	15	17 7 27.63	2.6190	23 55 56.4	-0.036
16	15 9 57.22	2.3536	21 7 9.6	6.712	16	17 10 4.87	2.6223	23 55 53.6	+0.130
17	15 12 18.64	2.3605	21 13 49.0	6.599	17	17 12 42.31	2.6256	23 55 40.8	0.297
18	15 14 40.48	2.3674	21 20 21.5	6.484	18	17 15 19.94	2.6287	23 55 17.9	0.466
19	15 17 2.73	2.3743	21 26 47.1	6.369	19	17 17 57.76	2.6317	23 54 44.9	0.634
20	15 19 25.39	2.3812	21 33 5.8	6.252	20	17 20 35.74	2.6344	23 54 1.8	0.802
21	15 21 48.47	2.3880	21 39 17.4	6.134	21	17 23 13.89	2.6372	23 53 8.6	0.972
22	15 24 11.95	2.3948	21 45 21.9	6.014	22	17 25 52.20	2.6397	23 52 5.2	1.142
23	15 26 35.84	2.4016	21 51 19.1	5.893	23	17 28 30.65	2.6421	23 50 51.5	1.312
	15 29 0.14	2.4083	S. 21 57 9.0	5.771		17 31 9.25	2.6444	S. 23 49 27.7	1.482
TUESDAY 18.					THURSDAY 20.				
0	h m s	"	S. ° ' "	"	0	h m s	"	S. ° ' "	"
1	15 31 24.84	2.4150	S. 22 2 51.6	5.647	1	17 33 47.98	2.6465	S. 23 47 53.7	1.652
2	15 33 49.94	2.4217	22 8 26.7	5.522	2	17 36 26.83	2.6485	23 46 9.4	1.824
3	15 36 15.45	2.4284	22 13 54.2	5.395	3	17 39 5.80	2.6503	23 44 14.8	1.996
4	15 38 41.35	2.4350	22 19 14.1	5.267	4	17 41 44.87	2.6520	23 42 9.9	2.168
5	15 41 7.65	2.4416	22 24 26.2	5.137	5	17 44 24.04	2.6536	23 39 54.7	2.340
6	15 43 34.34	2.4480	22 29 30.6	5.007	6	17 47 3.30	2.6550	23 37 29.1	2.512
7	15 46 1.41	2.4545	22 34 27.1	4.875	7	17 49 42.64	2.6568	23 34 53.3	2.683
8	15 48 28.88	2.4610	22 39 15.6	4.742	8	17 52 22.05	2.6574	23 32 7.1	2.856
9	15 50 56.73	2.4673	22 43 56.1	4.607	9	17 55 1.53	2.6584	23 29 10.6	3.027
10	15 53 24.95	2.4736	22 48 28.5	4.472	10	17 57 41.06	2.6592	23 26 3.8	3.200
11	15 55 53.56	2.4799	22 52 52.7	4.334	11	18 0 20.63	2.6598	23 22 46.6	3.372
12	15 58 22.54	2.4860	22 57 8.6	4.195	12	18 3 0.24	2.6604	23 19 19.1	3.544
13	16 0 51.88	2.4921	23 1 16.1	4.056	13	18 5 39.88	2.6608	23 15 41.3	3.716
14	16 3 21.59	2.4982	23 5 15.3	3.915	14	18 8 19.54	2.6611	23 11 53.2	3.888
15	16 5 51.66	2.5041	23 9 5.9	3.772	15	18 10 59.21	2.6612	23 7 54.7	4.060
16	16 8 22.08	2.5100	23 12 48.0	3.629	16	18 13 38.89	2.6612	23 3 46.0	4.231
17	16 10 52.86	2.5158	23 16 21.4	3.484	17	18 16 18.56	2.6610	22 59 27.0	4.402
18	16 13 23.98	2.5216	23 19 46.1	3.338	18	18 18 58.21	2.6607	22 54 57.8	4.572
19	16 15 55.45	2.5272	23 23 2.0	3.192	19	18 21 37.84	2.6602	22 50 18.3	4.743
20	16 18 27.25	2.5327	23 26 9.1	3.044	20	18 24 17.44	2.6597	22 45 28.6	4.912
21	16 20 59.38	2.5382	23 29 7.3	2.894	21	18 26 57.01	2.6590	22 40 28.8	5.082
22	16 23 31.84	2.5437	23 31 56.4	2.743	22	18 29 36.52	2.6581	22 35 18.8	5.251
23	16 26 4.62	2.5489	23 34 36.5	2.592	23	18 32 15.98	2.6572	22 29 58.7	5.419
24	16 28 37.71	2.5542	23 37 7.5	2.440	24	18 34 55.38	2.6560	22 24 28.5	5.587
	16 31 11.12	2.5593	S. 23 39 29.3	2.286		18 37 34.70	2.6547	S. 22 18 48.2	5.755

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 21.					SUNDAY 23.				
0	18 37 34.70	2.6547	S. 22 18 48.2	5.755	0	20 41 34.74	2.4899	S. 14 50 14.5	12.386
1	18 40 13.94	2.6533	22 12 57.9	5.921	1	20 44 3.63	2.4791	14 37 48.4	12.484
2	18 42 53.10	2.6519	22 6 57.7	6.087	2	20 46 32.23	2.4742	14 15 16.4	12.582
3	18 45 32.17	2.6503	22 0 47.5	6.252	3	20 49 0.53	2.4693	14 12 38.6	12.677
4	18 48 11.13	2.6484	21 54 27.5	6.415	4	20 51 28.55	2.4647	13 59 55.3	12.768
5	18 50 49.98	2.6465	21 47 57.7	6.579	5	20 53 56.29	2.4598	13 47 6.4	12.859
6	18 53 28.71	2.6445	21 41 18.0	6.742	6	20 56 23.73	2.4549	13 34 12.2	12.948
7	18 56 7.32	2.6424	21 34 28.6	6.903	7	20 58 50.88	2.4502	13 21 12.7	13.035
8	18 58 45.80	2.6402	21 27 29.6	7.064	8	21 1 17.75	2.4453	13 8 8.0	13.121
9	19 1 24.15	2.6379	21 20 20.9	7.224	9	21 3 44.32	2.4405	12 54 58.2	13.203
10	19 4 2.35	2.6354	21 13 2.7	7.382	10	21 6 10.61	2.4357	12 41 43.6	13.284
11	19 6 40.40	2.6328	21 5 35.0	7.541	11	21 8 36.61	2.4310	12 28 24.1	13.363
12	19 9 18.29	2.6302	20 57 57.8	7.698	12	21 11 2.33	2.4262	12 15 0.0	13.440
13	19 11 56.02	2.6273	20 50 11.2	7.853	13	21 13 27.76	2.4215	12 1 31.3	13.515
14	19 14 33.57	2.6244	20 42 15.4	8.008	14	21 15 52.91	2.4167	11 47 58.2	13.588
15	19 17 10.95	2.6214	20 34 10.3	8.162	15	21 18 17.77	2.4121	11 34 20.7	13.660
16	19 19 48.14	2.6183	20 25 56.0	8.314	16	21 20 42.36	2.4074	11 20 39.0	13.729
17	19 22 25.15	2.6152	20 17 32.6	8.465	17	21 23 6.66	2.4027	11 6 53.2	13.797
18	19 25 1.66	2.6119	20 9 0.2	8.614	18	21 25 30.69	2.3980	10 53 3.4	13.862
19	19 27 38.58	2.6086	20 0 18.9	8.762	19	21 27 54.44	2.3935	10 39 9.7	13.926
20	19 30 14.99	2.6051	19 51 28.7	8.909	20	21 30 17.91	2.3889	10 25 12.3	13.987
21	19 32 51.19	2.6015	19 42 29.8	9.055	21	21 32 41.11	2.3844	10 11 11.3	14.047
22	19 35 27.17	2.5979	19 33 22.1	9.200	22	21 35 4.04	2.3799	9 57 6.7	14.104
23	19 38 2.94	2.5942	S. 19 24 5.8	9.343	23	21 37 26.70	2.3754	S. 9 42 58.8	14.159
SATURDAY 22.					MONDAY 24.				
0	19 40 38.47	2.5903	S. 19 14 40.9	9.485	0	21 39 49.09	2.3710	S. 9 28 47.6	14.213
1	19 43 13.78	2.5865	19 5 7.6	9.624	1	21 42 11.22	2.3666	9 14 33.2	14.265
2	19 45 48.85	2.5826	18 55 26.0	9.762	2	21 44 33.08	2.3622	9 0 15.8	14.314
3	19 48 23.69	2.5787	18 45 36.1	9.899	3	21 46 54.69	2.3579	8 45 55.5	14.362
4	19 50 58.29	2.5746	18 35 38.1	10.035	4	21 49 16.03	2.3536	8 31 32.3	14.408
5	19 53 32.64	2.5704	18 25 31.9	10.169	5	21 51 37.12	2.3494	8 17 6.5	14.452
6	19 56 6.74	2.5662	18 15 17.8	10.301	6	21 53 57.96	2.3452	8 2 38.1	14.494
7	19 58 40.59	2.5620	18 4 55.8	10.431	7	21 56 18.55	2.3411	7 48 7.2	14.535
8	20 1 14.18	2.5577	17 54 26.1	10.560	8	21 58 38.89	2.3369	7 33 33.9	14.572
9	20 3 47.51	2.5533	17 43 48.6	10.688	9	22 0 58.98	2.3328	7 18 58.5	14.608
10	20 6 20.58	2.5490	17 33 3.5	10.814	10	22 3 18.83	2.3288	7 4 20.9	14.643
11	20 8 53.39	2.5445	17 22 10.9	10.937	11	22 5 38.44	2.3248	6 49 41.3	14.677
12	20 11 25.92	2.5400	17 11 11.0	11.059	12	22 7 57.81	2.3209	6 34 59.7	14.707
13	20 13 58.19	2.5355	17 0 3.8	11.180	13	22 10 16.95	2.3171	6 20 16.4	14.735
14	20 16 30.18	2.5309	16 48 49.4	11.299	14	22 12 35.86	2.3132	6 5 31.5	14.762
15	20 19 1.90	2.5264	16 37 27.9	11.416	15	22 14 54.54	2.3095	5 50 45.0	14.787
16	20 21 33.35	2.5217	16 25 59.5	11.531	16	22 17 13.00	2.3058	5 35 57.0	14.811
17	20 24 4.51	2.5170	16 14 24.2	11.644	17	22 19 31.24	2.3022	5 21 7.7	14.832
18	20 26 35.39	2.5124	16 2 42.2	11.756	18	22 21 49.26	2.2986	5 6 17.1	14.852
19	20 29 6.00	2.5077	15 50 53.5	11.866	19	22 24 7.07	2.2951	4 51 25.4	14.870
20	20 31 36.32	2.5029	15 38 58.3	11.973	20	22 26 24.67	2.2916	4 36 32.7	14.886
21	20 34 6.35	2.4982	15 26 56.7	12.079	21	22 28 42.06	2.2881	4 21 39.1	14.900
22	20 36 36.10	2.4934	15 14 48.8	12.183	22	22 30 59.24	2.2847	4 6 44.7	14.913
23	20 39 5.56	2.4887	15 2 34.7	12.286	23	22 33 16.23	2.2814	3 51 49.6	14.924
24	20 41 34.74	2.4839	S. 14 50 14.5	12.386	24	22 35 33.01	2.2781	S. 3 36 53.8	14.933

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 25.					THURSDAY 27.				
0	h m s		S. ° ' "	"	0	h m s		N. ° ' "	"
1	22 35 33.01	2.2781	3 36 53.8	14.933	1	0 22 18.32	2.1932	8 0 3.0	13.554
2	22 37 49.60	2.2749	3 21 57.6	14.940	2	0 24 29.90	2.1928	8 13 34.4	13.498
3	22 40 6.00	2.2718	3 7 1.0	14.946	3	0 26 41.46	2.1925	8 27 2.1	13.430
4	22 42 22.22	2.2687	2 52 4.1	14.950	4	0 28 53.00	2.1923	8 40 26.0	13.366
5	22 44 38.25	2.2657	2 37 7.0	14.952	5	0 31 4.54	2.1922	8 53 46.0	13.301
6	22 46 54.10	2.2627	2 22 9.8	14.952	6	0 33 16.06	2.1919	9 7 2.1	13.235
7	22 49 9.78	2.2599	2 7 12.7	14.952	7	0 35 27.57	2.1918	9 20 14.2	13.168
8	22 51 25.29	2.2570	1 52 15.6	14.949	8	0 37 39.08	2.1918	9 33 22.3	13.101
9	22 53 40.62	2.2542	1 37 18.8	14.944	9	0 39 50.59	2.1918	9 46 26.3	13.032
10	22 55 55.80	2.2516	1 22 22.3	14.938	10	0 42 2.10	2.1918	9 59 26.1	12.962
11	22 58 10.81	2.2488	1 7 26.2	14.930	11	0 44 13.61	2.1919	10 12 21.7	12.890
12	23 0 25.66	2.2462	0 52 30.7	14.921	12	0 46 25.13	2.1920	10 25 12.9	12.818
13	23 2 40.36	2.2437	0 37 35.7	14.910	13	0 48 36.65	2.1922	10 37 59.8	12.745
14	23 4 54.91	2.2413	0 22 41.5	14.897	14	0 50 48.19	2.1925	10 50 42.3	12.671
15	23 7 9.32	2.2389	S. 0 7 48.0	14.883	15	0 52 59.75	2.1927	11 3 20.3	12.595
16	23 9 23.58	2.2365	N. 0 7 4.5	14.867	16	0 55 11.32	2.1930	11 15 53.7	12.518
17	23 11 37.70	2.2342	0 21 56.0	14.850	17	0 57 22.91	2.1934	11 28 22.5	12.442
18	23 13 51.69	2.2320	0 36 46.5	14.832	18	0 59 34.53	2.1938	11 40 46.7	12.363
19	23 16 5.54	2.2298	0 51 35.8	14.811	19	1 1 46.17	2.1942	11 53 6.1	12.284
20	23 18 19.27	2.2278	1 6 23.8	14.789	20	1 3 57.83	2.1946	12 5 20.8	12.204
21	23 20 32.88	2.2257	1 21 10.5	14.766	21	1 6 9.52	2.1958	12 17 30.6	12.122
22	23 22 46.36	2.2237	1 35 55.7	14.741	22	1 8 21.25	2.1957	12 29 35.5	12.041
23	23 24 59.73	2.2218	1 50 39.4	14.715	23	1 10 33.01	2.1962	12 41 35.5	11.958
24	23 27 12.98	2.2199	N. 2 5 21.5	14.687	24	1 12 44.80	2.1967	N. 12 53 30.5	11.875
WEDNESDAY 26.					FRIDAY 28.				
0	23 29 26.12	2.2182	N. 2 20 1.8	14.657	0	1 14 56.62	2.1974	N. 13 5 20.5	11.791
1	23 31 39.16	2.2165	2 34 40.3	14.627	1	1 17 8.49	2.1982	13 17 5.4	11.705
2	23 33 52.10	2.2148	2 49 17.0	14.595	2	1 19 20.40	2.1988	13 28 45.1	11.618
3	23 36 4.94	2.2132	3 3 51.7	14.561	3	1 21 32.35	2.1996	13 40 19.6	11.531
4	23 38 17.69	2.2117	3 18 24.3	14.525	4	1 23 44.35	2.2003	13 51 48.8	11.443
5	23 40 30.34	2.2102	3 32 54.7	14.489	5	1 25 56.39	2.2011	14 3 12.7	11.354
6	23 42 42.91	2.2088	3 47 23.0	14.452	6	1 28 8.48	2.2019	14 14 31.3	11.264
7	23 44 55.40	2.2075	4 1 49.0	14.413	7	1 30 20.62	2.2027	14 25 44.4	11.173
8	23 47 7.81	2.2062	4 16 12.6	14.372	8	1 32 32.81	2.2036	14 36 52.1	11.082
9	23 49 20.14	2.2048	4 30 33.7	14.331	9	1 34 45.05	2.2045	14 47 54.3	10.990
10	23 51 32.39	2.2037	4 44 52.3	14.288	10	1 36 57.35	2.2054	14 58 50.9	10.897
11	23 53 44.58	2.2027	4 59 8.3	14.243	11	1 39 9.70	2.2063	15 9 41.9	10.802
12	23 55 56.71	2.2016	5 13 21.5	14.197	12	1 41 22.11	2.2073	15 20 27.2	10.707
13	23 58 8.77	2.2005	5 27 32.0	14.151	13	1 43 34.58	2.2083	15 31 6.8	10.612
14	0 0 20.77	2.1996	5 41 39.6	14.103	14	1 45 47.11	2.2092	15 41 40.7	10.517
15	0 2 32.72	2.1987	5 55 44.4	14.054	15	1 47 59.69	2.2102	15 52 8.8	10.420
16	0 4 44.62	2.1978	6 9 46.1	14.003	16	1 50 12.34	2.2113	16 2 31.1	10.322
17	0 6 56.46	2.1971	6 23 44.7	13.951	17	1 52 25.05	2.2124	16 12 47.5	10.224
18	0 9 8.27	2.1964	6 37 40.2	13.898	18	1 54 37.83	2.2135	16 22 58.0	10.125
19	0 11 20.03	2.1957	6 51 32.5	13.844	19	1 56 50.67	2.2145	16 33 2.5	10.025
20	0 13 31.75	2.1951	7 5 21.5	13.788	20	1 59 3.57	2.2156	16 43 1.0	9.925
21	0 15 43.44	2.1945	7 19 7.1	13.731	21	2 1 16.54	2.2167	16 52 53.5	9.823
22	0 17 55.09	2.1940	7 32 49.2	13.673	22	2 3 29.57	2.2177	17 2 39.8	9.722
23	0 20 6.72	2.1936	7 46 27.9	13.615	23	2 5 42.67	2.2189	17 12 20.1	9.619
24	0 22 18.32	2.1932	N. 8 0 3.0	13.554	24	2 7 55.84	2.2201	N. 17 21 54.1	9.513

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 29.					MONDAY 31.				
0	h m s		N. 17 21 54.1	9.515	0	h m s		N. 22 49 32.1	3.978
1	2 7 55.84	2.2201	17 31 21.9	9.412	1	3 55 39.03	2.2602	22 53 27.1	3.856
2	2 10 9.08	2.2212	17 40 43.5	9.307	2	3 57 54.65	2.2603	22 57 14.8	3.732
3	2 12 22.38	2.2223	17 49 58.8	9.202	3	4 0 10.27	2.2603	23 0 55.0	3.608
4	2 14 35.76	2.2235	17 59 7.8	9.097	4	4 2 25.89	2.2603	23 4 27.8	3.485
5	2 16 49.20	2.2246	18 8 10.4	8.990	5	4 4 41.51	2.2603	23 7 53.2	3.362
6	2 19 2.71	2.2257	18 17 6.6	8.883	6	4 6 57.13	2.2603	23 11 11.2	3.238
7	2 21 16.29	2.2269	18 25 56.4	8.776	7	4 9 12.75	2.2602	23 14 21.8	3.115
8	2 23 29.94	2.2280	18 34 39.7	8.667	8	4 11 28.36	2.2600	23 17 25.0	2.991
9	2 25 43.65	2.2291	18 43 16.5	8.558	9	4 13 43.95	2.2597	23 20 20.7	2.867
10	2 27 57.43	2.2302	18 51 46.7	8.448	10	4 15 59.53	2.2595	23 23 9.0	2.743
11	2 30 11.28	2.2314	19 0 10.3	8.339	11	4 18 15.09	2.2592	23 25 49.9	2.619
12	2 32 25.20	2.2325	19 8 27.4	8.229	12	4 20 30.64	2.2589	23 28 23.3	2.495
13	2 34 39.18	2.2336	19 16 37.8	8.118	13	4 22 46.16	2.2584	23 30 49.3	2.372
14	2 36 53.23	2.2347	19 24 41.6	8.007	14	4 25 1.65	2.2580	23 33 7.9	2.247
15	2 39 7.35	2.2359	19 32 38.6	7.894	15	4 27 17.12	2.2575	23 35 19.0	2.123
16	2 41 21.54	2.2370	19 40 28.9	7.782	16	4 29 32.55	2.2568	23 37 22.7	2.000
17	2 43 35.79	2.2381	19 48 12.4	7.669	17	4 31 47.94	2.2562	23 39 19.0	1.877
18	2 45 50.11	2.2392	19 55 49.2	7.556	18	4 34 3.30	2.2557	23 41 7.9	1.752
19	2 48 4.49	2.2402	20 3 19.1	7.441	19	4 36 18.62	2.2549	23 42 49.3	1.628
20	2 50 18.93	2.2412	20 10 42.1	7.327	20	4 38 33.89	2.2541	23 44 23.3	1.506
21	2 52 33.43	2.2422	20 17 58.3	7.212	21	4 40 49.11	2.2532	23 45 50.0	1.382
22	2 54 48.00	2.2433	20 25 7.6	7.097	22	4 43 4.28	2.2524	23 47 9.2	1.258
23	2 57 2.63	2.2442	N. 20 32 10.0	6.981	23	4 45 19.40	2.2515	N. 23 48 21.0	1.135
24	2 59 17.31	2.2452				4 47 34.46	2.2505		
SUNDAY 30.					TUESDAY, AUGUST 1.				
0	3 1 32.05	2.2462	N. 20 39 5.3	6.864	0	4 49 49.46	2.2495	N. 23 49 25.4	1.012
1	3 3 46.85	2.2472	20 45 53.7	6.748	PHASES OF THE MOON.				
2	3 6 1.71	2.2481	20 52 35.1	6.632					
3	3 8 16.62	2.2489	20 59 9.5	6.514					
4	3 10 31.58	2.2498	21 5 36.8	6.397					
5	3 12 46.60	2.2507	21 11 57.1	6.278	● New Moon . . . . . July 7 8 31.4 ☾ First Quarter . . . . . 15 11 59.0 ○ Full Moon . . . . . 22 9 41.4 ☾ Last Quarter . . . . . 29 0 42.4				
6	3 15 1.66	2.2514	21 18 10.2	6.160					
7	3 17 16.77	2.2522	21 24 16.3	6.042					
8	3 19 31.93	2.2530	21 30 15.2	5.922					
9	3 21 47.13	2.2537	21 36 6.9	5.802	d h m ☾ Apogee . . . . . July 10 4.3 ☾ Perigee . . . . . 22 23.7				
10	3 24 2.37	2.2544	21 41 51.4	5.682					
11	3 26 17.66	2.2551	21 47 28.8	5.562					
12	3 28 32.98	2.2557	21 52 58.9	5.442					
13	3 30 48.34	2.2562	21 58 21.8	5.322					
14	3 33 3.73	2.2567	22 3 37.5	5.201					
15	3 35 19.15	2.2573	22 8 45.9	5.079					
16	3 37 34.61	2.2578	22 13 47.0	4.957					
17	3 39 50.09	2.2582	22 18 40.8	4.836					
18	3 42 5.59	2.2586	22 23 27.3	4.714					
19	3 44 21.12	2.2590	22 28 6.5	4.592					
20	3 46 36.67	2.2593	22 32 38.3	4.469					
21	3 48 52.24	2.2597	22 37 2.8	4.347					
22	3 51 7.83	2.2599	22 41 20.0	4.225					
23	3 53 23.43	2.2600	22 45 29.8	4.101					
24	3 55 39.03	2.2602	N. 22 49 32.1	3.978					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Aquilæ W.	83 41 23	3058	85 10 24	3068	86 39 13	3078	88 7 49	3090
	Fomalhaut W.	58 18 15	3219	59 44 2	3209	61 10 0	3203	62 36 6	3196
	$\alpha$ Pegasi W.	35 56 58	2969	37 27 49	2953	38 59 1	2940	40 30 29	2929
	Aldebaran E.	43 45 6	2649	42 7 18	2666	40 29 53	2685	38 52 53	2703
	VENUS E.	53 7 5	2986	51 36 35	3000	50 6 22	3013	48 36 25	3026
	SUN E.	73 39 28	2894	72 7 2	2907	70 34 52	2920	69 2 59	2934
2	$\alpha$ Aquilæ W.	95 27 13	3153	96 54 18	3168	98 21 6	3183	99 47 36	3198
	Fomalhaut W.	69 47 54	3186	71 14 20	3187	72 40 45	3188	74 7 8	3191
	$\alpha$ Pegasi W.	48 10 18	2906	49 42 29	2906	51 14 40	2907	52 46 50	2909
	VENUS E.	41 10 43	3090	39 42 21	3102	38 14 14	3114	36 46 21	3126
	SUN E.	61 27 36	2996	59 57 18	3007	58 27 14	3019	56 57 25	3031
3	Fomalhaut W.	81 17 59	3214	82 43 51	3221	84 9 35	3228	85 35 11	3235
	$\alpha$ Pegasi W.	60 26 56	2924	61 58 44	2929	63 30 26	2934	65 2 2	2939
	SUN E.	49 31 52	3087	48 3 26	3096	46 35 12	3107	45 7 11	3118
4	Fomalhaut W.	92 40 50	3280	94 5 25	3289	95 29 49	3300	96 54 0	3312
	$\alpha$ Pegasi W.	72 38 18	2968	74 9 11	2974	75 39 56	2981	77 10 33	2987
	$\alpha$ Arietis W.	29 3 49	2910	30 35 55	2911	32 8 0	2912	33 40 3	2916
	SUN E.	37 50 11	3167	36 23 22	3177	34 56 45	3186	33 30 19	3195
5	$\alpha$ Pegasi W.	84 41 35	3021	86 11 22	3028	87 41 0	3034	89 10 30	3042
	$\alpha$ Arietis W.	41 19 17	2935	42 50 52	2939	44 22 22	2943	45 53 46	2949
	SUN E.	26 20 52	3240	24 55 30	3249	23 30 19	3259	22 5 19	3267
9	SUN W.	18 16 10	3436	19 37 46	3437	20 59 21	3438	22 20 54	3440
	MARS E.	38 30 27	3345	37 7 7	3351	35 43 55	3358	34 20 51	3367
	Spica E.	77 19 40	3065	75 50 47	3068	74 21 58	3070	72 53 12	3073
	JUPITER E.	85 34 4	3093	84 5 46	3097	82 37 33	3101	81 9 24	3103
10	SUN W.	29 8 13	3446	30 29 37	3447	31 51 0	3448	33 12 22	3448
	Spica E.	65 30 7	3083	64 1 37	3084	62 33 8	3085	61 4 40	3086
	JUPITER E.	73 49 24	3114	72 21 32	3115	70 53 41	3117	69 25 52	3118
11	SUN W.	39 59 15	3446	41 20 40	3444	42 42 7	3447	44 3 36	3440
	Spica E.	53 42 28	3086	52 14 1	3085	50 45 33	3083	49 17 3	3082
	JUPITER E.	62 7 2	3120	60 39 17	3120	59 11 32	3119	57 43 46	3119
	Antares E.	99 15 0	3082	97 46 29	3081	96 17 56	3080	94 49 22	3078
	SATURN E.	109 42 21	3060	108 13 23	3060	106 44 24	3058	105 15 23	3056
12	SUN W.	50 51 43	3424	52 13 32	3420	53 35 26	3415	54 57 25	3410
	Spica E.	41 54 2	3070	40 25 16	3068	38 56 27	3064	37 27 33	3060
	JUPITER E.	50 24 36	3111	48 56 40	3109	47 28 41	3107	46 0 40	3104
	Antares E.	87 25 47	3064	85 56 53	3060	84 27 54	3055	82 58 49	3051
	SATURN E.	97 49 35	3042	96 20 14	3039	94 50 49	3034	93 21 18	3029
13	SUN W.	61 48 58	3379	63 11 39	3371	64 34 29	3362	65 57 29	3354
	Regulus W.	24 42 42	3106	26 10 44	3091	27 39 5	3075	29 7 45	3060
	JUPITER E.	38 39 42	3089	37 11 19	3087	35 42 53	3084	34 14 24	3082
	Antares E.	75 31 52	3022	74 2 6	3014	72 32 11	3007	71 2 7	3000
	SATURN E.	85 52 7	3000	84 21 54	2993	82 51 33	2986	81 21 3	2978

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	α Aquilæ W.	89 36 11	3101	91 4 19	3113	92 32 13	3126	93 59 51	3139
	Fomalhaut W.	64 2 20	3192	65 28 39	3188	66 55 2	3186	68 21 28	3186
	α Pegasi W.	42 2 11	2921	43 34 3	2915	45 6 3	2910	46 38 9	2908
	Aldebaran E.	37 16 17	2722	35 40 7	2743	34 4 24	2764	32 29 9	2786
	VENUS E.	47 6 45	3039	45 37 21	3052	44 8 13	3065	42 39 20	3078
	SUN E.	67 31 23	2946	66 0 3	2958	64 28 58	2971	62 58 9	2984
2	α Aquilæ W.	101 13 48	3214	102 39 40	3231	104 5 13	3248	105 30 25	3266
	Fomalhaut W.	75 33 28	3194	76 59 44	3198	78 25 55	3204	79 52 0	3209
	α Pegasi W.	54 18 58	2911	55 51 3	2913	57 23 5	2916	58 55 3	2920
	VENUS E.	35 18 43	3138	33 51 19	3148	32 24 8	3160	30 57 11	3172
	SUN E.	55 27 51	3043	53 58 31	3053	52 29 24	3065	51 0 31	3076
3	Fomalhaut W.	87 0 39	3243	88 25 57	3252	89 51 5	3260	91 16 3	3270
	α Pegasi W.	66 33 31	2945	68 4 53	2950	69 36 9	2956	71 7 17	2962
	SUN E.	43 39 23	3128	42 11 47	3138	40 44 23	3148	39 17 11	3158
4	Fomalhaut W.	98 17 58	3323	99 41 43	3336	101 5 13	3349	102 28 28	3362
	α Pegasi W.	78 41 2	2993	80 11 23	3001	81 41 35	3007	83 11 39	3014
	α Arietis W.	35 12 2	2918	36 43 58	2922	38 15 49	2925	39 47 36	2930
	SUN E.	32 4 4	3204	30 38 0	3214	29 12 7	3222	27 46 24	3231
5	α Pegasi W.	90 39 51	3049	92 9 3	3056	93 38 7	3063	95 7 2	3071
	α Arietis W.	47 25 3	2954	48 56 14	2959	50 27 18	2964	51 58 16	2969
	SUN E.	20 40 29	3276	19 15 50	3286	17 51 22	3295	16 27 5	3304
9	SUN W.	23 42 25	3442	25 3 54	3443	26 25 22	3445	27 46 48	3446
	MARS E.	32 57 57	3376	31 35 13	3385	30 12 39	3394	28 50 16	3405
	Spica E.	71 24 30	3076	69 55 51	3078	68 27 14	3079	66 58 39	3082
	JUPITER E.	79 41 18	3106	78 13 16	3108	76 45 16	3110	75 17 19	3112
10	SUN W.	34 33 44	3448	35 55 6	3448	37 16 28	3447	38 37 51	3446
	Spica E.	59 36 13	3087	58 7 47	3087	56 39 21	3087	55 10 55	3086
	JUPITER E.	67 58 4	3119	66 30 18	3119	65 2 32	3120	63 34 47	3120
11	SUN W.	45 25 7	3438	46 46 41	3435	48 8 18	3431	49 29 59	3429
	Spica E.	47 48 32	3081	46 19 59	3078	44 51 23	3076	43 22 44	3073
	JUPITER E.	56 15 59	3118	54 48 11	3116	53 20 21	3115	51 52 30	3113
	Antares E.	93 20 45	3076	91 52 6	3073	90 23 23	3070	88 54 37	3067
	SATURN E.	103 46 19	3054	102 17 13	3052	100 48 4	3048	99 18 51	3046
12	SUN W.	56 19 30	3405	57 41 41	3399	59 3 59	3392	60 26 25	3386
	Spica E.	35 58 34	3056	34 29 31	3052	33 0 22	3047	31 31 8	3042
	JUPITER E.	44 32 35	3101	43 4 27	3099	41 36 16	3096	40 8 1	3092
	Antares E.	81 29 39	3046	80 0 23	3040	78 31 0	3034	77 1 30	3028
	SATURN E.	91 51 41	3024	90 21 58	3018	88 52 8	3013	87 22 11	3007
13	SUN W.	67 20 38	3345	68 43 58	3336	70 7 28	3325	71 31 10	3316
	Regulus W.	30 36 43	3047	32 5 58	3034	33 35 29	3020	35 5 17	3007
	JUPITER E.	32 45 52	3080	31 17 18	3078	29 48 41	3076	28 20 2	3075
	Antares E.	69 31 54	2991	68 1 30	2983	66 30 56	2974	65 0 11	2965
	SATURN E.	79 50 23	2970	78 19 33	2962	76 48 32	2953	75 17 20	2943

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
14	SUN W.	72 55 3	3305	74 19 9	3394	75 43 27	3282	77 7 59	3470
	Regulus W.	36 35 21	2993	38 5 42	2981	39 36 19	2967	41 7 13	2954
	Antares E.	63 29 14	2955	61 58 5	2945	60 26 43	2934	58 55 7	2924
	SATURN E.	73 45 56	2934	72 14 20	2924	70 42 31	2912	69 10 28	2902
15	SUN W.	84 14 24	3303	85 40 30	3189	87 6 52	3174	88 33 32	3158
	Regulus W.	48 46 3	2883	50 18 43	2869	51 51 42	2853	53 25 1	2838
	MARS W.	30 33 34	3157	32 0 35	3136	33 28 1	3115	34 55 52	3096
	Antares E.	51 13 32	2863	49 40 26	2850	48 7 3	2836	46 33 22	2823
	SATURN E.	61 26 37	2842	59 53 3	2828	58 19 12	2815	56 45 4	2801
	α Aquilæ E.	104 8 3	3368	102 45 10	3349	101 21 55	3329	99 58 17	3310
16	SUN W.	95 51 40	3077	97 20 18	3059	98 49 18	3041	100 18 40	3023
	Regulus W.	61 16 37	2758	62 52 0	2741	64 27 45	2724	66 3 53	2707
	MARS W.	42 21 12	2997	43 51 29	2977	45 22 11	2957	46 53 18	2937
	Antares E.	38 40 24	2750	37 4 50	2735	35 28 56	2719	33 52 41	2704
	SATURN E.	48 49 38	2726	47 13 33	2710	45 37 7	2695	44 0 20	2678
	α Aquilæ E.	92 54 43	3220	91 28 58	3203	90 2 52	3187	88 36 27	3170
17	SUN W.	107 51 12	2929	109 22 54	2910	110 55 0	2890	112 27 32	2870
	Regulus W.	74 10 24	2618	75 48 55	2599	77 27 52	2580	79 7 14	2561
	MARS W.	54 35 10	2837	56 8 50	2817	57 42 56	2797	59 17 28	2776
	Spica W.	20 8 39	2640	21 46 40	2616	23 25 13	2594	25 4 16	2572
	α Aquilæ E.	81 19 40	3056	79 51 26	3034	78 22 57	3022	76 54 13	3000
	Fomalhaut E.	107 2 29	3099	105 34 18	3073	104 5 35	3047	102 36 21	3023
18	SUN W.	120 16 34	2771	121 51 40	2750	123 27 13	2731	125 3 12	2710
	Regulus W.	87 30 34	2467	89 12 33	2448	90 54 59	2430	92 37 51	2411
	MARS W.	67 16 52	2675	68 54 6	2655	70 31 47	2634	72 9 56	2614
	Spica W.	33 27 0	2467	35 8 59	2447	36 51 27	2426	38 34 23	2408
	JUPITER W.	25 16 7	2580	26 55 30	2550	28 35 34	2522	30 16 17	2494
	α Aquilæ E.	69 27 21	3018	67 57 30	3012	66 27 32	3009	64 57 30	3007
	Fomalhaut E.	95 2 46	2909	93 30 39	2889	91 58 6	2869	90 25 7	2850
19	MARS W.	80 27 27	2517	82 8 17	2497	83 49 34	2479	85 31 17	2460
	Spica W.	47 16 3	2312	49 1 45	2293	50 47 55	2275	52 34 31	2257
	JUPITER W.	38 49 0	2373	40 33 13	2353	42 17 56	2331	44 3 10	2311
	α Aquilæ E.	57 27 39	3031	55 58 5	3044	54 28 47	3061	52 59 50	3083
	Fomalhaut E.	82 34 27	2769	80 59 18	2755	79 23 51	2743	77 48 8	2732
	α Pegasi E.	102 14 3	2443	100 31 30	2424	98 48 29	2405	97 5 1	2386
20	MARS W.	94 6 9	2375	95 50 19	2359	97 34 53	2344	99 19 48	2330
	Spica W.	61 33 57	2174	63 23 4	2159	65 12 34	2143	67 2 27	2130
	JUPITER W.	52 56 25	2219	54 44 24	2202	56 32 48	2186	58 21 36	2172
	Fomalhaut E.	69 46 30	2698	68 9 48	2697	66 33 4	2698	64 56 21	2701
	α Pegasi E.	88 21 19	2303	86 35 24	2288	84 49 7	2274	83 2 30	2261
21	Spica W.	76 17 3	2066	78 8 55	2055	80 1 4	2044	81 53 29	2035
	JUPITER W.	67 31 2	2105	69 21 54	2093	71 13 4	2083	73 4 30	2072
	Antares W.	30 46 12	2078	32 37 45	2065	34 29 38	2053	36 21 49	2043
	Fomalhaut E.	56 54 52	2756	55 19 26	2778	53 44 29	2803	52 10 5	2835
	α Pegasi E.	74 4 56	2208	72 16 41	2201	70 28 15	2194	68 39 39	2188

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
14	SUN	W.	78 32 46	3258	79 57 47	3245	81 23 3	3231	82 48 35	3217
	Regulus	W.	42 38 24	2940	44 9 52	2926	45 41 38	2912	47 13 41	2898
	Antares	E.	57 23 18	2712	55 51 14	2501	54 18 56	2888	52 46 22	2876
	SATURN	E.	67 38 12	2891	66 5 41	2881	64 32 56	2867	62 59 55	2854
15	SUN	W.	90 0 31	3143	91 27 49	3127	92 55 26	3110	94 23 23	3094
	Regulus	W.	54 58 39	2823	56 32 37	2807	58 6 56	2791	59 41 36	2775
	MARS	W.	36 24 7	3075	37 52 47	3056	39 21 51	3036	40 51 19	3016
	Antares	E.	44 59 24	2808	43 25 7	2795	41 50 32	2780	40 15 38	2765
	SATURN	E.	55 10 37	2786	53 35 51	2772	52 0 47	2757	50 25 23	2741
	α Aquilæ	E.	98 34 17	3291	97 9 55	3273	95 45 12	3255	94 20 8	3237
16	SUN	W.	101 48 24	3005	103 18 31	2986	104 49 1	2967	106 19 55	2949
	Regulus	W.	67 40 23	2689	69 17 17	2672	70 54 35	2654	72 32 17	2635
	MARS	W.	48 24 50	2917	49 56 47	2898	51 29 9	2877	53 1 57	2858
	Antares	E.	32 16 6	2688	30 39 10	2672	29 1 53	2657	27 24 15	2641
	SATURN	E.	42 23 11	2662	40 45 40	2646	39 7 47	2629	37 29 31	2612
	α Aquilæ	E.	87 9 42	3155	85 42 39	3139	84 15 17	3124	82 47 37	3110
17	SUN	W.	114 0 29	2850	115 33 52	2831	117 7 40	2811	118 41 54	2791
	Regulus	W.	80 47 2	2543	82 27 15	2524	84 7 55	2505	85 49 1	2486
	MARS	W.	60 52 27	2756	62 27 52	2735	64 3 45	2715	65 40 5	2695
	Spica	W.	26 43 50	2550	28 23 54	2529	30 4 27	2508	31 45 29	2487
	α Aquilæ	E.	75 25 14	3049	73 56 2	3040	72 26 39	3031	70 57 5	3023
	Fomalhaut	E.	101 6 37	2999	99 36 23	2975	98 5 39	2952	96 34 26	2931
18	SUN	W.	126 39 38	2691	128 16 30	2672	129 53 48	2652	131 31 32	2632
	Regulus	W.	94 21 10	2392	96 4 56	2374	97 49 8	2356	99 33 46	2337
	MARS	W.	73 48 32	2594	75 27 35	2574	77 7 6	2555	78 47 3	2535
	Spica	W.	40 17 47	2387	42 1 40	2368	43 46 0	2349	45 30 48	2331
	JUPITER	W.	31 57 39	2468	33 39 37	2443	35 22 11	2419	37 5 19	2396
	α Aquilæ	E.	63 27 26	3007	61 57 22	3009	60 27 21	3014	58 57 25	3022
	Fomalhaut	E.	88 51 44	2831	87 17 57	2815	85 43 48	2798	84 9 18	2782
19	MARS	W.	87 13 26	2443	88 56 0	2425	90 38 59	2408	92 22 22	2391
	Spica	W.	54 21 34	2240	56 9 2	2223	57 56 56	2206	59 45 14	2190
	JUPITER	W.	45 48 53	2291	47 35 5	2272	49 21 45	2254	51 8 52	2237
	α Aquilæ	E.	51 31 20	3109	50 3 21	3139	48 35 59	3176	47 9 21	3220
	Fomalhaut	E.	76 12 10	2722	74 36 0	2713	72 59 38	2707	71 23 7	2702
	α Pegasi	E.	95 21 6	2368	93 36 46	2351	91 52 1	2335	90 6 52	2318
20	MARS	W.	101 5 4	2315	102 50 41	2302	104 36 37	2289	106 22 52	2278
	Spica	W.	68 52 41	2115	70 43 17	2102	72 34 13	2089	74 25 29	2077
	JUPITER	W.	60 10 46	2157	62 0 19	2143	63 50 13	2129	65 40 28	2116
	Fomalhaut	E.	63 19 42	2706	61 43 10	2713	60 6 48	2725	58 30 41	2738
	α Pegasi	E.	81 15 33	2249	79 28 18	2237	77 40 46	2227	75 52 58	2217
21	Spica	W.	83 46 8	2026	85 39 1	2018	87 32 7	2010	89 25 25	2004
	JUPITER	W.	74 56 12	2063	76 48 8	2055	78 40 16	2048	80 32 36	2041
	Antares	W.	38 14 16	2033	40 6 58	2024	41 59 55	2016	43 53 4	2009
	Fomalhaut	E.	50 36 22	2870	49 3 25	2912	47 31 22	2961	46 0 20	3018
	α Pegasi	E.	66 50 54	2184	65 2 3	2182	63 13 8	2180	61 24 11	2180



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
22	Spica W.	91 18 53	1998	93 12 30	1993	95 6 15	1989	97 0 7	1986
	JUPITER W.	82 25 7	2035	84 17 47	2030	86 10 35	2025	88 3 30	2022
	Antares W.	45 46 25	2002	47 39 56	1997	49 33 35	1992	51 27 22	1987
	SATURN W.	35 53 33	1991	37 47 21	1985	39 41 19	1981	41 35 24	1976
	α Pegasi E.	59 35 13	2181	57 46 17	2184	55 57 26	2188	54 8 41	2195
	α Arietis E.	101 59 42	2016	100 6 33	2011	98 13 16	2007	96 19 52	2003
23	Antares W.	60 57 26	1981	62 51 31	1981	64 45 35	1983	66 39 36	1986
	SATURN W.	51 7 3	1968	53 1 28	1969	54 55 51	1970	56 50 12	1973
	α Arietis E.	86 51 50	1997	84 58 11	1998	83 4 33	2000	81 10 58	2003
24	Antares W.	76 8 19	2009	78 1 39	2016	79 54 48	2024	81 47 45	2032
	SATURN W.	66 20 34	1996	68 14 14	2003	70 7 43	2011	72 1 0	2019
	α Arietis E.	71 44 38	2030	69 51 50	2037	67 59 13	2045	66 6 49	2053
	Aldebaran E.	104 37 38	2042	102 45 9	2048	100 52 50	2055	99 0 42	2063
25	SATURN W.	81 23 51	2070	83 15 36	2082	85 7 3	2094	86 58 11	2107
	α Aquilæ W.	44 0 48	3198	45 27 0	3138	46 54 24	3088	48 22 48	3046
	α Arietis E.	56 48 46	2111	54 58 4	2124	53 7 42	2139	51 17 42	2153
	Aldebaran E.	89 43 28	2113	87 52 49	2126	86 2 29	2138	84 12 28	2151
26	α Aquilæ W.	55 55 31	2915	57 27 31	2901	58 59 48	2891	60 32 18	2883
	α Arietis E.	42 13 35	2237	40 26 3	2257	38 39 0	2277	36 52 26	2298
	Aldebaran E.	75 7 35	2224	73 19 43	2240	71 32 15	2256	69 45 11	2272
	SUN E.	129 8 3	2489	127 26 35	2506	125 45 30	2522	124 4 47	2538
27	α Aquilæ W.	68 16 22	2877	69 49 10	2881	71 21 53	2887	72 54 29	2894
	Fomalhaut W.	43 51 54	3365	45 14 50	3319	46 38 39	3280	48 3 14	3247
	Aldebaran E.	60 56 7	2361	59 11 36	2380	57 27 32	2398	55 43 55	2417
	SUN E.	115 47 5	2625	114 8 44	2643	112 30 48	2661	110 53 16	2680
28	α Aquilæ W.	80 34 48	2944	82 6 11	2957	83 37 18	2971	85 8 7	2985
	Fomalhaut W.	55 14 2	3148	56 41 13	3138	58 8 37	3130	59 36 10	3123
	Aldebaran E.	47 12 43	2517	45 31 53	2538	43 51 33	2559	42 11 42	2581
	VENUS E.	89 20 8	2859	87 46 57	2879	86 14 11	2897	84 41 48	2916
	SUN E.	102 51 42	2771	101 16 36	2788	99 41 53	2807	98 7 34	2825
29	Fomalhaut W.	66 54 49	3123	68 22 31	3127	69 50 8	3131	71 17 40	3136
	α Pegasi W.	45 10 52	2852	46 44 13	2853	48 17 32	2856	49 50 47	2860
	VENUS E.	77 5 43	3006	75 35 38	3023	74 5 54	3041	72 36 32	3058
	SUN E.	90 21 44	2912	88 49 41	2930	87 18 0	2946	85 46 40	2964
30	Fomalhaut W.	78 33 26	3174	80 0 6	3183	81 26 36	3193	82 52 54	3202
	α Pegasi W.	57 35 28	2891	59 7 59	2898	60 40 21	2906	62 12 32	2914
	VENUS E.	65 14 51	3140	63 47 30	3156	62 20 28	3172	60 53 45	3187
	SUN E.	78 15 9	3043	76 45 50	3058	75 16 49	3073	73 48 7	3087
31	Fomalhaut W.	90 1 17	3259	91 26 17	3271	92 51 2	3284	94 15 32	3296
	α Pegasi W.	69 50 48	2958	71 21 54	2966	72 52 49	2975	74 23 33	2984
	α Arietis W.	26 14 16	2914	27 46 17	2916	29 18 16	2919	30 50 11	2922
	VENUS E.	53 44 33	3259	52 19 33	3271	50 54 48	3284	49 30 18	3298
	SUN E.	66 28 55	3157	65 1 54	3169	63 35 8	3183	62 8 38	3194

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
22	Spica W.	98 54 4	1982	100 48 6	1981	102 42 10	1980	104 36 16	1979
	JUPITER W.	89 56 30	2019	91 49 34	2017	93 42 42	2016	95 35 51	2015
	Antares W.	53 21 16	1985	55 15 14	1982	57 9 16	1981	59 3 20	1980
	SATURN W.	43 29 36	1973	45 23 53	1970	47 18 14	1968	49 12 38	1968
	α Pegasi E.	52 20 6	2203	50 31 43	2214	48 43 37	2228	46 55 51	2244
	α Arietis E.	94 26 22	2000	92 32 48	1998	90 39 10	1996	88 45 30	1996
23	Antares W.	68 33 33	1989	70 27 25	1993	72 21 11	1998	74 14 49	2003
	SATURN W.	58 44 29	1976	60 38 41	1981	62 32 46	1985	64 26 44	1990
	α Arietis E.	79 17 28	2006	77 24 3	2011	75 30 46	2016	73 37 37	2023
24	Antares W.	83 40 29	2041	85 32 59	2051	87 25 14	2061	89 17 13	2072
	SATURN W.	73 54 4	2028	75 46 54	2038	77 39 29	2048	79 31 48	2059
	α Arietis E.	64 14 40	2064	62 22 46	2075	60 31 8	2086	58 39 48	2098
	Aldebaran E.	97 8 46	2072	95 17 4	2081	93 25 36	2092	91 34 24	2102
25	SATURN W.	88 48 59	2121	90 39 26	2134	92 29 33	2149	94 19 18	2163
	α Aquilæ W.	49 52 4	3009	51 22 5	2980	52 52 43	2954	54 23 53	2932
	α Arietis E.	49 28 4	2169	47 38 49	2185	45 49 59	2202	44 1 34	2219
	Aldebaran E.	82 22 47	2165	80 33 26	2179	78 44 27	2194	76 55 50	2208
26	α Aquilæ W.	62 4 59	2877	63 37 47	2875	65 10 38	2874	66 43 30	2874
	α Arietis E.	35 6 24	2380	33 20 54	2344	31 35 58	2368	29 51 37	2394
	Aldebaran E.	67 58 31	2289	66 12 16	2307	64 26 27	2325	62 41 4	2343
	SUN E.	122 24 27	2556	120 44 31	2572	119 4 58	2590	117 25 49	2608
27	α Aquilæ W.	74 26 56	2901	75 59 13	2911	77 31 18	2921	79 3 10	2932
	Fomalhaut W.	49 28 28	3220	50 54 14	3195	52 20 29	3177	53 47 6	3161
	Aldebaran E.	54 0 45	2437	52 18 3	2456	50 35 48	2476	48 54 1	2497
	SUN E.	109 16 9	2698	107 39 26	2716	106 3 7	2734	104 27 12	2753
28	α Aquilæ W.	86 38 39	3000	88 8 52	3015	89 38 46	3031	91 8 20	3047
	Fomalhaut W.	61 3 49	3122	62 31 32	3119	63 59 18	3119	65 27 4	3120
	Aldebaran E.	40 32 21	2603	38 53 30	2626	37 15 11	2650	35 37 24	2675
	VENUS E.	83 9 49	2934	81 38 13	2952	80 7 0	2970	78 36 10	2989
	SUN E.	96 33 38	2843	95 0 6	2860	93 26 56	2878	91 54 9	2895
29	Fomalhaut W.	72 45 6	3143	74 12 24	3149	75 39 34	3157	77 6 35	3165
	α Pegasi W.	51 23 57	2865	52 57 1	2870	54 29 58	2876	56 2 47	2883
	VENUS E.	71 7 31	3075	69 38 51	3091	68 10 31	3108	66 42 31	3124
	SUN E.	84 15 42	2980	82 45 4	2996	81 14 46	3012	79 44 48	3027
30	Fomalhaut W.	84 19 1	3213	85 44 55	3224	87 10 36	3236	88 36 3	3247
	α Pegasi W.	63 44 33	2923	65 16 23	2931	66 48 2	2940	68 19 30	2948
	VENUS E.	59 27 20	3202	58 1 13	3216	56 35 23	3231	55 9 50	3244
	SUN E.	72 19 42	3102	70 51 35	3116	69 23 45	3130	67 56 12	3143
31	Fomalhaut W.	95 39 48	3310	97 3 48	3323	98 27 33	3337	99 51 2	3351
	α Pegasi W.	75 54 6	2993	77 24 28	3001	78 54 39	3010	80 24 39	3018
	α Arietis W.	32 22 2	2925	33 53 49	2930	35 25 30	2935	36 57 5	2940
	VENUS E.	48 6 4	3310	46 42 4	3323	45 18 19	3335	43 54 48	3346
	SUN E.	60 42 22	3207	59 16 21	3218	57 50 33	3230	56 24 59	3241

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
Tues.	1	<sup>h</sup> 8 <sup>m</sup> 45 <sup>s</sup> 38.46	9.710	N. 18° 1' 22.5"	-37.80	15' 47.98"	66.65	<sup>m</sup> 6 <sup>s</sup> 6.91	0.146
Wed.	2	8 49 31.21	9.685	17 46 6.5	38.53	15 48.10	66.56	6 3.12	0.170
Thur.	3	8 53 23.36	9.661	17 30 33.0	39.25	15 48.23	66.47	5 58.73	0.195
Frid.	4	8 57 14.93	9.636	17 14 42.5	-39.95	15 48.36	66.38	5 53.75	0.220
Sat.	5	9 1 5.90	9.611	16 58 35.1	40.65	15 48.50	66.29	5 48.18	0.244
SUN.	6	9 4 56.27	9.586	16 42 11.3	41.33	15 48.64	66.21	5 42.02	0.269
Mon.	7	9 8 46.05	9.562	16 25 31.2	-42.00	15 48.79	66.12	5 35.26	0.294
Tues.	8	9 12 35.24	9.537	16 8 35.3	42.65	15 48.94	66.04	5 27.91	0.319
Wed.	9	9 16 23.83	9.512	15 51 23.9	43.29	15 49.10	65.95	5 19.97	0.343
Thur.	10	9 20 11.84	9.488	15 33 57.3	-43.92	15 49.26	65.87	5 11.44	0.368
Frid.	11	9 23 59.26	9.464	15 16 15.8	44.53	15 49.43	65.79	5 2.33	0.392
Sat.	12	9 27 46.09	9.440	14 58 19.8	45.13	15 49.60	65.71	4 52.64	0.416
SUN.	13	9 31 32.36	9.416	14 40 9.4	-45.72	15 49.77	65.63	4 42.38	0.439
Mon.	14	9 35 18.06	9.392	14 21 45.2	46.30	15 49.95	65.55	4 31.55	0.463
Tues.	15	9 39 3.19	9.369	14 3 7.4	46.86	15 50.13	65.47	4 20.16	0.486
Wed.	16	9 42 47.78	9.347	13 44 16.3	-47.41	15 50.32	65.40	4 8.24	0.508
Thur.	17	9 46 31.84	9.323	13 25 12.1	47.93	15 50.51	65.32	3 55.77	0.529
Frid.	18	9 50 15.37	9.303	13 5 55.2	48.45	15 50.70	65.25	3 42.78	0.551
Sat.	19	9 53 58.39	9.281	12 46 26.0	-48.97	15 50.89	65.18	3 29.29	0.572
SUN.	20	9 57 40.92	9.261	12 26 44.6	49.47	15 51.09	65.11	3 15.30	0.592
Mon.	21	10 1 22.97	9.242	12 6 51.3	49.96	15 51.28	65.04	3 0.83	0.612
Tues.	22	10 5 4.55	9.223	11 46 46.6	-50.43	15 51.48	64.97	2 45.90	0.631
Wed.	23	10 8 45.69	9.205	11 26 30.6	50.89	15 51.68	64.91	2 30.53	0.649
Thur.	24	10 12 26.40	9.188	11 6 3.6	51.34	15 51.89	64.85	2 14.72	0.667
Frid.	25	10 16 6.69	9.171	10 45 26.0	-51.78	15 52.09	64.79	1 58.51	0.684
Sat.	26	10 19 46.60	9.155	10 24 38.1	52.21	15 52.30	64.73	1 41.91	0.700
SUN.	27	10 23 26.12	9.139	10 3 40.1	52.62	15 52.51	64.67	1 24.93	0.715
Mon.	28	10 27 5.29	9.125	9 42 32.4	-53.02	15 52.72	64.61	1 7.59	0.730
Tues.	29	10 30 44.11	9.111	9 21 15.4	53.40	15 52.93	64.56	0 49.90	0.744
Wed.	30	10 34 22.60	9.098	8 59 49.2	53.77	15 53.15	64.51	0 31.89	0.757
Thur.	31	10 38 0.78	9.085	8 38 14.4	54.13	15 53.37	64.46	0 13.56	0.770
Frid.	32	10 41 38.66	9.072	N. 8 16 31.1	-54.47	15 53.60	64.42	0 5.06	0.782

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.									
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.	
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.			
Tues.	1	<sup>h</sup> 8 <sup>m</sup> 45 <sup>s</sup> 37.47	9.711	N. 18° 1' 26.3"	-37.80	<sup>m</sup> 6 <sup>s</sup> 6.93	0.146	<sup>h</sup> 8 <sup>m</sup> 39 <sup>s</sup> 30.54	
Wed.	2	8 49 30.23	9.686	17 46 10.3	38.53	6 3.13	0.170	8 43 27.10	
Thur.	3	8 53 22.40	9.661	17 30 36.9	39.25	5 58.75	0.195	8 47 23.65	
Frid.	4	8 57 13.98	9.636	17 14 46.4	-39.95	5 53.77	0.220	8 51 20.21	
Sat.	5	9 1 4.97	9.612	16 58 39.0	40.65	5 48.20	0.244	8 55 16.76	
SUN.	6	9 4 55.36	9.587	16 42 15.1	41.33	5 42.04	0.269	8 59 13.32	
Mon.	7	9 8 45.16	9.563	16 25 35.0	-42.00	5 35.29	0.294	9 3 9.87	
Tues.	8	9 12 34.37	9.538	16 8 39.1	42.65	5 27.94	0.319	9 7 6.43	
Wed.	9	9 16 22.99	9.514	15 51 27.7	43.29	5 20.00	0.343	9 11 2.98	
Thur.	10	9 20 11.02	9.489	15 34 1.0	-43.92	5 11.48	0.368	9 14 59.54	
Frid.	11	9 23 58.46	9.465	15 16 19.5	44.53	5 2.37	0.392	9 18 56.10	
Sat.	12	9 27 45.33	9.441	14 58 23.4	45.13	4 52.68	0.416	9 22 52.65	
SUN.	13	9 31 31.62	9.417	14 40 13.0	-45.72	4 42.42	0.439	9 26 49.20	
Mon.	14	9 35 17.35	9.394	14 21 48.7	46.30	4 31.59	0.463	9 30 45.76	
Tues.	15	9 39 2.51	9.371	14 3 10.7	46.86	4 20.20	0.486	9 34 42.32	
Wed.	16	9 42 47.14	9.348	13 44 19.5	-47.41	4 8.27	0.508	9 38 38.87	
Thur.	17	9 46 31.23	9.326	13 25 15.2	47.94	3 55.80	0.530	9 42 35.42	
Frid.	18	9 50 14.79	9.305	13 5 58.2	48.46	3 42.81	0.552	9 46 31.98	
Sat.	19	9 53 57.85	9.284	12 46 28.7	-48.98	3 29.32	0.573	9 50 28.53	
SUN.	20	9 57 40.41	9.264	12 26 47.2	49.48	3 15.33	0.593	9 54 25.09	
Mon.	21	10 1 22.50	9.244	12 6 53.8	49.97	2 0.86	0.612	9 58 21.64	
Tues.	22	10 5 4.12	9.225	11 46 48.8	-50.44	2 45.93	0.631	10 2 18.20	
Wed.	23	10 8 45.30	9.207	11 26 32.6	50.90	2 30.55	0.650	10 6 14.75	
Thur.	24	10 12 26.05	9.190	11 6 5.5	51.35	2 14.75	0.667	10 10 11.30	
Frid.	25	10 16 6.39	9.173	10 45 27.7	-51.79	1 58.53	0.684	10 14 7.86	
Sat.	26	10 19 46.34	9.157	10 24 39.5	52.22	1 41.93	0.700	10 18 4.41	
SUN.	27	10 23 25.91	9.141	10 3 41.3	52.63	1 24.95	0.715	10 22 0.96	
Mon.	28	10 27 5.12	9.126	9 42 33.4	-53.03	1 7.60	0.730	10 25 57.52	
Tues.	29	10 30 43.98	9.112	9 21 16.1	53.41	0 49.91	0.744	10 29 54.07	
Wed.	30	10 34 22.52	9.099	8 59 49.7	53.78	0 31.90	0.757	10 33 50.62	
Thur.	31	10 38 0.75	9.087	8 38 14.5	54.14	0 13.57	0.770	10 37 47.18	
Frid.	32	10 41 38.67	9.075	N. 8 16 31.0	-54.48	0 5.06	0.782	10 41 43.73	
NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.								Diff. for 1 Hour, + 9 <sup>s</sup> 8565. (Table III.)	

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
		$^{\circ}$ $'$ $''$	$'$ $''$	$''$	$''$			$^h$ $^m$ $^s$
1	213	128 58 38.0	57 50.2	143.58	— 0.01	0.0063786	—22.9	15 17 58.66
2	214	129 56 4.5	55 16.5	143.63	0.14	0.0063225	23.8	15 14 2.75
3	215	130 53 32.0	52 43.9	143.67	0.27	0.0062643	24.7	15 10 6.84
4	216	131 51 0.7	50 12.5	143.72	— 0.40	0.0062038	—25.7	15 6 10.93
5	217	132 48 30.5	47 42.1	143.76	0.52	0.0061410	26.7	15 2 15.02
6	218	133 46 1.5	45 13.0	143.81	0.62	0.0060758	27.7	14 58 19.11
7	219	134 43 33.5	42 44.8	143.85	— 0.70	0.0060083	—28.6	14 54 23.20
8	220	135 41 6.5	40 17.7	143.90	0.75	0.0059383	29.6	14 50 27.29
9	221	136 38 40.5	37 51.6	143.94	0.78	0.0058659	30.5	14 46 31.38
10	222	137 36 15.5	35 26.4	143.98	— 0.77	0.0057918	—31.4	14 42 35.47
11	223	138 33 51.4	33 2.2	144.02	0.73	0.0057152	32.3	14 38 39.56
12	224	139 31 28.3	30 39.0	144.06	0.66	0.0056366	33.1	14 34 43.66
13	225	140 29 6.1	28 16.6	144.10	— 0.57	0.0055564	—33.8	14 30 47.75
14	226	141 26 45.0	25 55.4	144.14	0.46	0.0054745	34.5	14 26 51.84
15	227	142 24 24.7	23 35.0	144.18	0.34	0.0053911	35.1	14 22 55.93
16	228	143 22 5.6	21 15.7	144.22	— 0.21	0.0053061	—35.6	14 19 0.02
17	229	144 19 47.6	18 57.6	144.27	— 0.08	0.0052200	36.1	14 15 4.11
18	230	145 17 30.6	16 40.5	144.32	+ 0.05	0.0051328	36.6	14 11 8.20
19	231	146 15 15.0	14 24.8	144.37	+ 0.17	0.0050445	—37.0	14 7 12.29
20	232	147 13 0.4	12 10.0	144.43	0.26	0.0049553	37.4	14 3 16.38
21	233	148 10 47.4	9 56.9	144.49	0.33	0.0048653	37.7	13 59 20.48
22	234	149 8 35.8	7 45.2	144.55	+ 0.36	0.0047745	—38.0	13 55 24.57
23	235	150 6 25.7	5 35.0	144.61	0.38	0.0046827	38.4	13 51 28.66
24	236	151 4 17.2	3 26.4	144.68	0.36	0.0045903	38.7	13 47 32.75
25	237	152 2 10.4	1 19.5	144.75	+ 0.31	0.0044968	—39.1	13 43 36.84
26	238	152 60 5.4	59 14.4	144.82	0.24	0.0044024	39.5	13 39 40.94
27	239	153 58 2.1	57 10.9	144.90	0.13	0.0043070	40.0	13 35 45.03
28	240	154 56 0.7	55 9.4	144.98	+ 0.01	0.0042103	—40.5	13 31 49.12
29	241	155 54 1.3	53 9.0	145.00	— 0.11	0.0041126	41.0	13 27 53.21
30	242	156 52 3.7	51 12.2	145.14	0.24	0.0040134	41.6	13 23 57.30
31	243	157 50 8.1	49 10.5	145.22	0.37	0.0039129	42.2	13 20 1.40
32	244	158 48 14.3	47 22.6	145.30	0.50	0.0038107	42.3	13 16 5.49

NOTE. The numbers in column  $\lambda$  correspond to the true eq<sup>s</sup> of the date, in column  $\lambda'$  to the mean eq<sup>s</sup> of January Jan.

Diff. for 1 Hour.  
— 9' 52.96.  
(Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	15 6.1	15 1.9	55 18.7	-1.35	55 3.4	-1.20	20 53.6	2.12	24.6	
2	14 58.2	14 55.0	54 49.8	1.07	54 37.8	0.93	21 43.7	2.05	25.6	
3	14 52.2	14 49.8	54 27.5	0.80	54 18.7	0.68	22 32.0	1.96	26.6	
4	14 47.7	14 46.1	54 11.3	-0.55	54 5.4	-0.43	23 17.9	1.87	27.6	
5	14 44.9	14 44.0	54 0.9	0.32	53 57.7	-0.21	0		28.6	
6	14 43.6	14 43.4	53 55.9	-0.10	53 55.4	+0.02	0 1.8	1.79	0.0	
7	14 43.7	14 44.3	53 56.3	+0.13	53 58.6	+0.25	0 44.0	1.73	1.0	
8	14 45.3	14 46.7	54 2.3	0.37	54 7.5	0.50	1 25.1	1.70	2.0	
9	14 48.6	14 50.9	54 14.3	0.64	54 22.8	0.78	2 5.8	1.70	3.0	
10	14 53.6	14 56.9	54 32.9	+0.92	54 44.9	+1.08	2 47.1	1.74	4.0	
11	15 0.7	15 4.9	54 58.7	1.23	55 14.4	1.39	3 29.7	1.82	5.0	
12	15 9.7	15 15.1	55 32.1	1.55	55 51.6	1.70	4 14.7	1.93	6.0	
13	15 20.9	15 27.2	56 13.0	+1.85	56 36.1	+1.99	5 2.9	2.08	7.0	
14	15 33.9	15 41.0	57 0.8	2.11	57 26.8	2.21	5 54.8	2.24	8.0	
15	15 48.3	15 55.9	57 53.8	2.28	58 21.5	2.31	6 50.5	2.39	9.0	
16	16 3.4	16 10.9	58 49.3	+2.30	59 16.7	+2.24	7 49.3	2.50	10.0	
17	16 18.1	16 24.8	59 43.1	2.13	60 7.9	1.96	8 49.9	2.53	11.0	
18	16 30.9	16 36.1	60 30.2	1.73	60 49.4	1.45	9 50.3	2.49	12.0	
19	16 40.4	16 43.4	61 4.9	+1.11	61 16.2	+0.74	10 49.2	2.41	13.0	
20	16 45.2	16 45.6	61 22.6	+0.33	61 24.2	-0.08	11 45.9	2.31	14.0	
21	16 44.6	16 42.3	61 20.6	-0.50	61 12.1	0.91	12 40.5	2.24	15.0	
22	16 38.7	16 34.0	60 58.8	-1.28	60 41.4	-1.60	13 33.5	2.19	16.0	
23	16 28.2	16 21.7	60 20.3	1.88	59 56.2	2.10	14 25.9	2.18	17.0	
24	16 14.5	16 6.9	59 29.9	2.26	59 2.0	2.36	15 18.2	2.19	18.0	
25	15 59.1	15 51.2	58 33.3	-2.40	58 4.3	-2.40	16 10.9	2.21	19.0	
26	15 43.4	15 35.9	57 35.8	2.35	57 8.1	2.26	17 4.0	2.22	20.0	
27	15 28.7	15 21.9	56 41.6	2.14	56 16.7	2.00	17 57.1	2.20	21.0	
28	15 15.6	15 9.9	55 53.7	-1.84	55 32.6	-1.67	18 49.5	2.16	22.0	
29	15 4.7	15 0.2	55 13.7	1.49	54 57.0	1.30	19 40.3	2.08	23.0	
30	14 56.2	14 52.8	54 42.4	1.12	54 30.0	0.94	20 29.2	1.99	24.0	
31	14 50.1	14 47.8	54 19.8	0.77	54 11.6	0.60	21 15.8	1.90	25.0	
32	14 46.1	14 44.9	54 5.4	-0.44	54 1.0	-0.29	22 0.3	1.81	26.0	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 1.					THURSDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	4 49 49.46	2.2495	N.23 49 25.4	1.012	0	6 35 38.01	2.1419	N.22 21 38.6	4.512
1	4 52 4.40	2.2483	23 50 22.5	0.890	1	6 37 46.43	2.1387	22 17 4.8	4.615
2	4 54 19.26	2.2472	23 51 12.2	0.767	2	6 39 54.66	2.1355	22 12 24.8	4.718
3	4 56 34.06	2.2460	23 51 54.5	0.644	3	6 42 2.69	2.1322	22 7 38.6	4.821
4	4 58 48.78	2.2447	23 52 29.5	0.522	4	6 44 10.53	2.1290	22 2 46.3	4.922
5	5 1 3.43	2.2435	23 52 57.2	0.400	5	6 46 18.17	2.1257	21 57 48.0	5.022
6	5 3 18.00	2.2421	23 53 17.5	0.278	6	6 48 25.61	2.1223	21 52 43.6	5.122
7	5 5 32.48	2.2407	23 53 30.5	0.157	7	6 50 32.85	2.1190	21 47 33.3	5.222
8	5 7 46.88	2.2392	23 53 36.3	+ 0.035	8	6 52 39.89	2.1157	21 42 17.0	5.321
9	5 10 1.18	2.2376	23 53 34.7	- 0.087	9	6 54 46.73	2.1122	21 36 54.8	5.419
10	5 12 15.39	2.2361	23 53 25.9	0.207	10	6 56 53.36	2.1088	21 31 26.7	5.517
11	5 14 29.51	2.2345	23 53 9.8	0.328	11	6 58 59.79	2.1054	21 25 52.8	5.613
12	5 16 43.53	2.2328	23 52 46.5	0.448	12	7 1 6.01	2.1020	21 20 13.1	5.709
13	5 18 57.45	2.2311	23 52 16.0	0.569	13	7 3 12.03	2.0985	21 14 27.7	5.805
14	5 21 11.26	2.2293	23 51 38.2	0.689	14	7 5 17.83	2.0950	21 8 36.5	5.900
15	5 23 24.96	2.2274	23 50 53.3	0.808	15	7 7 23.43	2.0916	21 2 39.7	5.993
16	5 25 38.55	2.2256	23 50 1.3	0.927	16	7 9 28.82	2.0881	20 56 37.3	6.087
17	5 27 52.03	2.2237	23 49 2.1	1.047	17	7 11 34.00	2.0846	20 50 29.3	6.179
18	5 30 5.39	2.2217	23 47 55.7	1.166	18	7 13 38.97	2.0810	20 44 15.8	6.272
19	5 32 18.63	2.2197	23 46 42.2	1.283	19	7 15 43.72	2.0775	20 37 56.7	6.363
20	5 34 31.75	2.2176	23 45 21.7	1.401	20	7 17 48.27	2.0740	20 31 32.2	6.453
21	5 36 44.74	2.2154	23 43 54.1	1.518	21	7 19 52.60	2.0704	20 25 2.3	6.543
22	5 38 57.60	2.2132	23 42 19.5	1.635	22	7 21 56.72	2.0668	20 18 27.0	6.632
23	5 41 10.33	2.2110	N.23 40 37.9	1.752	23	7 24 0.62	2.0633	N.20 11 46.4	6.721
WEDNESDAY 2.					FRIDAY 4.				
0	5 43 22.92	2.2087	N.23 38 49.2	1.869	0	7 26 4.32	2.0598	N.20 5 0.5	6.808
1	5 45 35.38	2.2065	23 36 53.6	1.984	1	7 28 7.80	2.0562	19 58 9.4	6.896
2	5 47 47.70	2.2041	23 34 51.1	2.100	2	7 30 11.07	2.0527	19 51 13.0	6.982
3	5 49 59.87	2.2016	23 32 41.6	2.215	3	7 32 14.12	2.0491	19 44 11.5	7.067
4	5 52 11.89	2.1992	23 30 25.3	2.329	4	7 34 16.96	2.0455	19 37 4.9	7.153
5	5 54 23.77	2.1967	23 28 2.1	2.443	5	7 36 19.58	2.0419	19 29 53.2	7.237
6	5 56 35.50	2.1942	23 25 32.1	2.557	6	7 38 21.99	2.0384	19 22 36.5	7.319
7	5 58 47.07	2.1916	23 22 55.3	2.670	7	7 40 24.19	2.0349	19 15 14.9	7.402
8	6 0 58.49	2.1890	23 20 11.7	2.782	8	7 42 26.18	2.0313	19 7 48.3	7.484
9	6 3 9.75	2.1863	23 17 21.4	2.894	9	7 44 27.95	2.0277	19 0 16.8	7.566
10	6 5 20.85	2.1836	23 14 24.4	3.007	10	7 46 29.51	2.0242	18 52 40.4	7.647
11	6 7 31.78	2.1807	23 11 20.6	3.117	11	7 48 30.85	2.0207	18 44 59.2	7.726
12	6 9 42.54	2.1780	23 8 10.3	3.227	12	7 50 31.99	2.0172	18 37 13.3	7.804
13	6 11 53.14	2.1752	23 4 53.3	3.338	13	7 52 32.91	2.0137	18 29 22.7	7.882
14	6 14 3.56	2.1723	23 1 29.7	3.447	14	7 54 33.63	2.0102	18 21 27.4	7.960
15	6 16 13.82	2.1695	22 57 59.6	3.557	15	7 56 34.13	2.0066	18 13 27.5	8.037
16	6 18 23.90	2.1665	22 54 22.9	3.666	16	7 58 34.42	2.0031	18 5 23.0	8.112
17	6 20 33.80	2.1635	22 50 39.7	3.773	17	8 0 34.50	1.9997	17 57 14.0	8.187
18	6 22 43.52	2.1606	22 46 50.1	3.881	18	8 2 34.38	1.9962	17 49 0.5	8.262
19	6 24 53.07	2.1576	22 42 54.0	3.987	19	8 4 34.04	1.9927	17 40 42.6	8.336
20	6 27 2.43	2.1544	22 38 51.6	4.093	20	8 6 33.50	1.9892	17 32 20.2	8.409
21	6 29 11.60	2.1513	22 34 42.8	4.199	21	8 8 32.75	1.9858	17 23 53.5	8.481
22	6 31 20.59	2.1483	22 30 27.7	4.304	22	8 10 31.80	1.9824	17 15 22.5	8.552
23	6 33 29.40	2.1452	22 26 6.3	4.409	23	8 12 30.64	1.9790	17 6 47.2	8.623
24	6 35 38.01	2.1419	N.22 21 38.6	4.512	24	8 14 29.28	1.9757	N.16 58 7.7	8.693

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 5.					MONDAY 7.				
0	h m s		N. 16 58 7.7	8.693	0	h m s		N. 8 54 27.4	11.178
1	8 14 29.28	1.9757	16 49 24.0	8.762	1	9 45 55.02	1.8467	8 43 15.7	11.212
2	8 16 27.72	1.9723	16 40 36.2	8.831	2	9 47 45.77	1.8450	8 32 2.0	11.245
3	8 18 25.95	1.9689	16 31 44.3	8.898	3	9 49 36.42	1.8433	8 20 46.3	11.277
4	8 20 23.99	1.9656	16 22 48.4	8.965	4	9 51 26.97	1.8417	8 9 28.7	11.309
5	8 22 21.82	1.9622	16 13 48.5	9.032	5	9 53 17.42	1.8400	7 58 9.2	11.341
6	8 24 19.46	1.9590	16 4 44.6	9.097	6	9 55 7.77	1.8384	7 46 47.8	11.372
7	8 26 16.90	1.9557	15 55 36.8	9.162	7	9 56 58.03	1.8369	7 35 24.6	11.402
8	8 28 14.15	1.9525	15 46 25.2	9.226	8	9 58 48.20	1.8354	7 23 59.6	11.431
9	8 30 11.20	1.9492	15 37 9.7	9.289	9	10 0 38.28	1.8340	7 12 32.9	11.458
10	8 32 8.06	1.9461	15 27 50.5	9.351	10	10 2 28.28	1.8326	7 1 4.6	11.486
11	8 34 4.73	1.9429	15 18 27.6	9.412	11	10 4 18.19	1.8312	6 49 34.6	11.514
12	8 36 1.21	1.9397	15 9 1.0	9.473	12	10 6 8.03	1.8299	6 38 2.9	11.541
13	8 37 57.50	1.9367	14 59 30.8	9.534	13	10 7 57.78	1.8286	6 26 29.7	11.566
14	8 39 53.61	1.9336	14 49 56.9	9.594	14	10 9 47.46	1.8275	6 14 55.0	11.591
15	8 41 49.53	1.9305	14 40 19.5	9.652	15	10 11 37.08	1.8263	6 3 18.8	11.615
16	8 43 45.27	1.9275	14 30 38.6	9.710	16	10 13 26.62	1.8252	5 51 41.2	11.638
17	8 45 40.83	1.9245	14 20 54.3	9.767	17	10 15 16.10	1.8242	5 40 2.2	11.662
18	8 47 36.21	1.9215	14 11 6.6	9.823	18	10 17 5.52	1.8232	5 28 21.8	11.685
19	8 49 31.41	1.9186	14 1 15.5	9.879	19	10 18 54.88	1.8222	5 16 40.0	11.707
20	8 51 26.44	1.9157	13 51 21.1	9.934	20	10 20 44.19	1.8213	5 4 57.0	11.727
21	8 53 21.29	1.9127	13 41 23.4	9.988	21	10 22 33.44	1.8205	4 53 12.8	11.747
22	8 55 15.97	1.9099	13 31 22.4	10.042	22	10 24 22.65	1.8197	4 41 27.4	11.766
23	8 57 10.48	1.9071	N. 13 21 18.3	10.094	23	10 26 11.81	1.8189	N. 4 29 40.9	11.785
24	8 59 4.82	1.9043				10 28 0.92	1.8182		
SUNDAY 6.					TUESDAY 8.				
0	9 0 58.99	1.9015	N. 13 11 11.1	10.147	0	10 29 49.99	1.8176	N. 4 17 53.2	11.804
1	9 2 53.00	1.8988	13 1 0.7	10.198	1	10 31 39.03	1.8170	4 6 4.4	11.822
2	9 4 46.85	1.8962	12 50 47.3	10.248	2	10 33 28.03	1.8164	3 54 14.6	11.838
3	9 6 40.54	1.8935	12 40 30.9	10.298	3	10 35 17.00	1.8159	3 42 23.8	11.854
4	9 8 34.07	1.8908	12 30 11.5	10.347	4	10 37 5.94	1.8155	3 30 32.1	11.870
5	9 10 27.44	1.8882	12 19 49.2	10.396	5	10 37 54.86	1.8151	3 18 39.4	11.885
6	9 12 20.66	1.8857	12 9 24.0	10.443	6	10 40 43.75	1.8147	3 6 45.9	11.899
7	9 14 13.73	1.8832	11 58 56.0	10.490	7	10 42 32.63	1.8145	2 54 51.5	11.912
8	9 16 6.65	1.8808	11 48 25.2	10.537	8	10 44 21.49	1.8143	2 42 56.4	11.925
9	9 17 59.43	1.8784	11 37 51.6	10.582	9	10 46 10.34	1.8141	2 31 0.5	11.937
10	9 19 52.06	1.8759	11 27 15.3	10.627	10	10 47 59.18	1.8140	2 19 3.9	11.948
11	9 21 44.54	1.8736	11 16 36.4	10.671	11	10 49 48.02	1.8139	2 7 6.7	11.959
12	9 23 36.89	1.8713	11 5 54.8	10.714	12	10 51 36.85	1.8138	1 55 8.8	11.969
13	9 25 29.10	1.8690	10 55 10.7	10.757	13	10 53 25.68	1.8139	1 43 10.4	11.978
14	9 27 21.17	1.8667	10 44 24.0	10.799	14	10 55 14.52	1.8141	1 31 11.4	11.987
15	9 29 13.11	1.8646	10 33 34.8	10.840	15	10 57 3.37	1.8142	1 19 11.9	11.996
16	9 31 4.92	1.8624	10 22 43.2	10.880	16	10 58 52.22	1.8143	1 7 11.9	12.003
17	9 32 56.60	1.8603	10 11 49.2	10.920	17	11 0 41.09	1.8147	0 55 11.5	12.010
18	9 34 48.16	1.8583	10 0 52.8	10.958	18	11 2 29.98	1.8150	0 43 10.7	12.016
19	9 36 39.60	1.8562	9 49 54.2	10.997	19	11 4 18.89	1.8153	0 31 9.6	12.022
20	9 38 30.91	1.8542	9 38 53.2	11.035	20	11 6 7.82	1.8157	0 19 8.1	12.027
21	9 40 22.11	1.8523	9 27 50.0	11.071	21	11 7 56.78	1.8162	N. 0 7 6.4	12.030
22	9 42 13.19	1.8504	9 16 44.6	11.107	22	11 9 45.77	1.8168	S. 0 4 55.5	12.033
23	9 44 4.16	1.8486	9 5 37.1	11.143	23	11 11 34.80	1.8174	0 16 57.6	12.036
24	9 45 55.02	1.8467	N. 8 54 27.4	11.178	24	11 13 23.86	1.8181	S. 0 28 59.8	12.038



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 9.					FRIDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	11 13 23.86	1.8181	S. 0 28 59.8	12.038	1	12 42 31.00	1.9178	S. 9 55 51.7	11.300
2	11 15 12.97	1.8188	0 41 2.2	12.040	2	12 44 26.18	1.9213	10 7 8.7	11.266
3	11 17 2.11	1.8195	0 53 4.6	12.040	3	12 46 21.56	1.9249	10 18 23.6	11.232
4	11 18 51.31	1.8204	1 5 7.0	12.040	4	12 48 17.17	1.9287	10 29 36.5	11.197
5	11 20 40.56	1.8212	1 17 9.4	12.040	5	12 50 13.00	1.9323	10 40 47.2	11.159
6	11 22 29.86	1.8222	1 29 11.8	12.039	6	12 52 9.05	1.9360	10 51 55.6	11.122
7	11 24 19.22	1.8232	1 41 14.1	12.037	7	12 54 5.32	1.9398	11 3 1.8	11.084
8	11 26 8.64	1.8242	1 53 16.2	12.033	8	12 56 1.83	1.9437	11 14 5.7	11.045
9	11 27 58.13	1.8253	2 5 18.1	12.030	9	12 57 58.57	1.9476	11 25 7.2	11.005
10	11 29 47.68	1.8265	2 17 19.8	12.026	10	12 59 55.54	1.9516	11 36 6.3	10.965
11	11 31 37.31	1.8277	2 29 21.2	12.021	11	13 1 52.76	1.9557	11 47 3.0	10.923
12	11 33 27.01	1.8289	2 41 22.3	12.015	12	13 3 50.22	1.9597	11 57 57.1	10.881
13	11 35 16.78	1.8302	2 53 23.0	12.009	13	13 5 47.93	1.9639	12 8 48.7	10.837
14	11 37 6.64	1.8317	3 5 23.4	12.002	14	13 7 45.89	1.9681	12 19 37.6	10.793
15	11 38 56.59	1.8332	3 17 23.3	11.994	15	13 9 44.10	1.9723	12 30 23.9	10.748
16	11 40 46.62	1.8347	3 29 22.7	11.986	16	13 11 42.57	1.9767	12 41 7.4	10.702
17	11 42 36.75	1.8363	3 41 21.6	11.977	17	13 13 41.30	1.9811	12 51 48.1	10.655
18	11 44 26.98	1.8379	3 53 20.0	11.967	18	13 15 40.30	1.9855	13 2 26.0	10.607
19	11 46 17.30	1.8396	4 5 17.7	11.957	19	13 17 39.56	1.9899	13 13 1.0	10.559
20	11 48 7.73	1.8414	4 17 14.8	11.946	20	13 19 39.09	1.9943	13 23 33.1	10.509
21	11 49 58.27	1.8432	4 29 11.2	11.934	21	13 21 38.90	1.9991	13 34 2.1	10.458
22	11 51 48.92	1.8451	4 41 6.9	11.922	22	13 23 38.98	2.0037	13 44 28.1	10.407
23	11 53 39.68	1.8469	4 53 1.8	11.908	23	13 25 39.34	2.0084	13 54 51.0	10.355
24	11 55 30.55	1.8489	S. 5 4 55.9	11.894	24	13 27 39.99	2.0132	S. 14 5 10.7	10.301
THURSDAY 10.					SATURDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	11 57 21.55	1.8510	S. 5 16 49.1	11.879	1	13 29 40.92	2.0179	S. 14 15 27.1	10.247
2	11 59 12.67	1.8531	5 28 41.4	11.864	2	13 31 42.14	2.0227	14 25 40.3	10.192
3	12 1 3.92	1.8552	5 40 32.8	11.848	3	13 33 43.65	2.0277	14 35 50.1	10.135
4	12 2 55.30	1.8575	5 52 23.2	11.831	4	13 35 45.46	2.0326	14 45 56.5	10.078
5	12 4 46.82	1.8597	6 4 12.5	11.812	5	13 37 47.56	2.0376	14 55 59.4	10.020
6	12 6 38.47	1.8621	6 16 0.7	11.794	6	13 39 49.97	2.0427	15 5 58.9	9.961
7	12 8 30.27	1.8645	6 27 47.8	11.776	7	13 41 52.68	2.0477	15 15 54.7	9.900
8	12 10 22.21	1.8669	6 39 33.8	11.757	8	13 43 55.70	2.0528	15 25 46.9	9.839
9	12 12 14.30	1.8695	6 51 18.6	11.736	9	13 45 59.02	2.0580	15 35 35.4	9.777
10	12 14 6.55	1.8722	7 3 2.1	11.714	10	13 48 2.66	2.0632	15 45 20.1	9.713
11	12 15 58.96	1.8747	7 14 44.3	11.692	11	13 50 6.61	2.0685	15 55 1.0	9.649
12	12 17 51.52	1.8773	7 26 25.1	11.668	12	13 52 10.88	2.0738	16 4 38.0	9.584
13	12 19 44.24	1.8801	7 38 4.4	11.644	13	13 54 15.47	2.0792	16 14 11.1	9.518
14	12 21 37.13	1.8829	7 49 42.4	11.621	14	13 56 20.38	2.0846	16 23 40.2	9.451
15	12 23 30.19	1.8858	8 1 18.9	11.595	15	13 58 25.62	2.0900	16 33 5.2	9.382
16	12 25 23.43	1.8888	8 12 53.8	11.569	16	14 0 31.18	2.0955	16 42 26.0	9.312
17	12 27 16.85	1.8918	8 24 27.2	11.543	17	14 2 37.08	2.1010	16 51 42.7	9.242
18	12 29 10.45	1.8948	8 35 59.0	11.516	18	14 4 43.30	2.1065	17 0 55.0	9.170
19	12 31 4.23	1.8979	8 47 29.1	11.487	19	14 6 49.86	2.1122	17 10 3.1	9.098
20	12 32 58.20	1.9011	8 58 57.4	11.457	20	14 8 56.76	2.1177	17 19 6.8	9.024
21	12 34 52.36	1.9043	9 10 24.0	11.428	21	14 11 3.99	2.1233	17 28 6.0	8.949
22	12 36 46.72	1.9077	9 21 48.8	11.397	22	14 13 11.56	2.1291	17 37 0.7	8.874
23	12 38 41.28	1.9110	9 33 11.7	11.366	23	14 15 19.48	2.1348	17 45 50.9	8.797
24	12 40 36.04	1.9143	9 44 32.7	11.333	24	14 17 27.74	2.1406	17 54 36.4	8.718
	12 42 31.00	1.9178	S. 9 55 51.7	11.300		14 19 36.35	2.1464	S. 18 3 17.1	8.639

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 13.					TUESDAY 15.				
0	14 19 36.35	2.1464	S. 18 3 17.1	8.639	0	16 9 33.44	2.4317	S. 23 4 59.4	3.485
1	14 21 45.31	2.1522	18 11 53.1	8.559	1	16 11 59.51	2.4371	23 8 24.5	3.349
2	14 23 54.62	2.1581	18 20 24.2	8.477	2	16 14 25.89	2.4423	23 11 41.3	3.213
3	14 26 4.28	2.1639	18 28 50.4	8.395	3	16 16 52.59	2.4476	23 14 50.0	3.076
4	14 28 14.29	2.1698	18 37 11.6	8.312	4	16 19 19.60	2.4527	23 17 50.4	2.937
5	14 30 24.66	2.1757	18 45 27.8	8.227	5	16 21 46.92	2.4579	23 20 42.5	2.798
6	14 32 35.38	2.1817	18 53 38.9	8.142	6	16 24 14.55	2.4630	23 23 26.2	2.657
7	14 34 46.47	2.1877	19 1 44.8	8.054	7	16 26 42.48	2.4679	23 26 1.4	2.516
8	14 36 57.91	2.1937	19 9 45.4	7.966	8	16 29 10.70	2.4727	23 28 28.1	2.373
9	14 39 9.71	2.1997	19 17 40.7	7.877	9	16 31 39.21	2.4776	23 30 46.2	2.230
10	14 41 21.88	2.2058	19 25 30.6	7.787	10	16 34 8.01	2.4824	23 32 55.7	2.087
11	14 43 34.41	2.2118	19 33 15.1	7.695	11	16 36 37.10	2.4871	23 34 56.6	1.941
12	14 45 47.30	2.2179	19 40 54.0	7.602	12	16 39 6.46	2.4916	23 36 48.6	1.794
13	14 48 0.56	2.2240	19 48 27.3	7.508	13	16 41 36.09	2.4961	23 38 31.9	1.648
14	14 50 14.18	2.2301	19 55 55.0	7.413	14	16 44 5.99	2.5006	23 40 6.4	1.500
15	14 52 28.17	2.2362	20 3 16.9	7.317	15	16 46 36.16	2.5049	23 41 31.9	1.351
16	14 54 42.53	2.2423	20 10 33.1	7.220	16	16 49 6.58	2.5092	23 42 48.5	1.202
17	14 56 57.25	2.2484	20 17 43.3	7.121	17	16 51 37.26	2.5133	23 43 56.1	1.052
18	14 59 12.34	2.2546	20 24 47.6	7.021	18	16 54 8.18	2.5173	23 44 54.7	0.901
19	15 1 27.80	2.2608	20 31 45.8	6.920	19	16 56 39.34	2.5214	23 45 44.2	0.748
20	15 3 43.63	2.2669	20 38 38.0	6.818	20	16 59 10.75	2.5253	23 46 24.5	0.595
21	15 5 59.83	2.2730	20 45 24.0	6.715	21	17 1 42.38	2.5290	23 46 55.6	0.442
22	15 8 16.39	2.2791	20 52 3.8	6.611	22	17 4 14.23	2.5327	23 47 17.6	0.288
23	15 10 33.32	2.2852	S. 20 58 37.3	6.504	23	17 6 46.30	2.5363	S. 23 47 30.2	-0.133
MONDAY 14.					WEDNESDAY 16.				
0	15 12 50.62	2.2914	S. 21 5 4.3	6.397	0	17 9 18.59	2.5399	S. 23 47 33.6	+0.022
1	15 15 8.29	2.2976	21 11 25.0	6.290	1	17 11 51.09	2.5432	23 47 27.6	0.177
2	15 17 26.33	2.3037	21 17 39.1	6.181	2	17 14 23.78	2.5465	23 47 12.3	0.334
3	15 19 44.73	2.3097	21 23 46.7	6.071	3	17 16 56.67	2.5497	23 46 47.5	0.492
4	15 22 3.50	2.3158	21 29 47.6	5.958	4	17 19 29.75	2.5528	23 46 13.2	0.650
5	15 24 22.63	2.3218	21 35 41.7	5.846	5	17 22 3.01	2.5558	23 45 29.5	0.808
6	15 26 42.12	2.3279	21 41 29.1	5.732	6	17 24 36.45	2.5587	23 44 36.3	0.967
7	15 29 1.98	2.3340	21 47 9.6	5.617	7	17 27 10.06	2.5615	23 43 33.5	1.127
8	15 31 22.20	2.3400	21 52 43.1	5.501	8	17 29 43.83	2.5642	23 42 21.1	1.286
9	15 33 42.78	2.3460	21 58 9.7	5.383	9	17 32 17.76	2.5667	23 40 59.2	1.446
10	15 36 3.72	2.3519	22 3 29.1	5.264	10	17 34 51.84	2.5692	23 39 27.6	1.607
11	15 38 25.01	2.3578	22 8 41.4	5.145	11	17 37 26.06	2.5714	23 37 46.4	1.767
12	15 40 46.66	2.3638	22 13 46.5	5.024	12	17 40 0.41	2.5737	23 35 55.5	1.929
13	15 43 8.67	2.3697	22 18 44.3	4.902	13	17 42 34.90	2.5758	23 33 54.9	2.090
14	15 45 31.02	2.3755	22 23 34.7	4.778	14	17 45 9.51	2.5777	23 31 44.7	2.252
15	15 47 53.73	2.3813	22 28 17.7	4.654	15	17 47 44.23	2.5797	23 29 24.7	2.414
16	15 50 16.78	2.3871	22 32 53.2	4.529	16	17 50 19.07	2.5815	23 26 55.0	2.577
17	15 52 40.18	2.3929	22 37 21.2	4.402	17	17 52 54.01	2.5831	23 24 15.5	2.739
18	15 55 3.93	2.3986	22 41 41.5	4.274	18	17 55 29.04	2.5846	23 21 26.3	2.902
19	15 57 28.01	2.4042	22 45 54.1	4.146	19	17 58 4.16	2.5861	23 18 27.3	3.064
20	15 59 52.43	2.4098	22 49 59.0	4.016	20	18 0 39.37	2.5874	23 15 18.6	3.227
21	16 2 17.19	2.4154	22 53 56.0	3.884	21	18 3 14.65	2.5885	23 12 0.1	3.390
22	16 4 42.28	2.4209	22 57 45.1	3.752	22	18 5 49.99	2.5896	23 8 31.8	3.552
23	16 7 7.70	2.4263	23 1 26.3	3.619	23	18 8 25.40	2.5907	23 4 53.8	3.715
24	16 9 33.44	2.4317	S. 23 4 59.4	3.485	24	18 11 0.87	2.5915	S. 23 1 6.0	3.878

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 17.					SATURDAY 19.				
0	18 11 0.87	2.5915	S. 23 1 6.0	3.878	0	20 14 24.97	2.5174	S. 16 55 56.9	11.009
1	18 13 36.38	2.5922	22 57 8.4	4.042	1	20 16 55.92	2.5142	16 44 52.7	11.131
2	18 16 11.93	2.5928	22 53 1.0	4.204	2	20 19 26.67	2.5108	16 33 41.2	11.251
3	18 18 47.52	2.5933	22 48 43.9	4.367	3	20 21 57.22	2.5076	16 22 22.6	11.369
4	18 21 23.13	2.5937	22 44 17.0	4.529	4	20 24 27.58	2.5042	16 10 56.9	11.487
5	18 23 58.76	2.5940	22 39 40.4	4.692	5	20 26 57.73	2.5008	15 59 24.2	11.602
6	18 26 34.41	2.5942	22 34 54.0	4.853	6	20 29 27.68	2.4974	15 47 44.6	11.717
7	18 29 10.06	2.5942	22 29 58.0	5.015	7	20 31 57.42	2.4939	15 35 58.2	11.828
8	18 31 45.71	2.5942	22 24 52.2	5.177	8	20 34 26.95	2.4905	15 24 5.2	11.939
9	18 34 21.36	2.5941	22 19 36.8	5.337	9	20 36 56.28	2.4871	15 12 5.5	12.048
10	18 36 57.00	2.5938	22 14 11.7	5.498	10	20 39 25.40	2.4836	14 59 59.4	12.155
11	18 39 32.62	2.5934	22 8 37.0	5.658	11	20 41 54.31	2.4800	14 47 46.9	12.261
12	18 42 8.21	2.5929	22 2 52.7	5.818	12	20 44 23.00	2.4765	14 35 28.1	12.365
13	18 44 43.77	2.5923	21 56 58.8	5.977	13	20 46 51.49	2.4730	14 23 3.1	12.467
14	18 47 19.29	2.5916	21 50 55.4	6.136	14	20 49 19.76	2.4694	14 10 32.1	12.567
15	18 49 54.76	2.5907	21 44 42.5	6.294	15	20 51 47.82	2.4658	13 57 55.1	12.666
16	18 52 30.18	2.5898	21 38 20.1	6.452	16	20 54 15.66	2.4622	13 45 12.2	12.762
17	18 55 5.54	2.5888	21 31 48.2	6.610	17	20 56 43.29	2.4587	13 32 23.6	12.857
18	18 57 40.84	2.5877	21 25 6.9	6.766	18	20 59 10.71	2.4552	13 19 29.3	12.951
19	19 0 16.07	2.5866	21 18 16.3	6.922	19	21 1 37.91	2.4515	13 6 29.5	13.042
20	19 2 51.23	2.5853	21 11 16.3	7.077	20	21 4 4.89	2.4479	12 53 24.2	13.132
21	19 5 26.31	2.5839	21 4 7.0	7.232	21	21 6 31.66	2.4444	12 40 13.7	13.219
22	19 8 1.30	2.5824	20 56 48.5	7.385	22	21 8 58.22	2.4408	12 26 57.9	13.306
23	19 10 36.20	2.5808	S. 20 49 20.8	7.537	23	21 11 24.56	2.4372	S. 12 13 37.0	13.390
FRIDAY 18.					SUNDAY 20.				
0	19 13 11.00	2.5792	S. 20 41 44.0	7.689	0	21 13 50.69	2.4337	S. 12 0 11.1	13.472
1	19 15 45.70	2.5774	20 33 58.1	7.841	1	21 16 16.61	2.4302	11 46 40.4	13.552
2	19 18 20.29	2.5756	20 26 3.1	7.991	2	21 18 42.31	2.4267	11 33 4.9	13.630
3	19 20 54.77	2.5737	20 17 59.2	8.140	3	21 21 7.81	2.4232	11 19 24.8	13.707
4	19 23 29.13	2.5717	20 9 46.3	8.288	4	21 23 33.09	2.4196	11 5 40.1	13.782
5	19 26 3.37	2.5696	20 1 24.6	8.435	5	21 25 58.16	2.4162	10 51 51.0	13.854
6	19 28 37.48	2.5674	19 52 54.1	8.582	6	21 28 23.03	2.4127	10 37 57.6	13.925
7	19 31 11.46	2.5652	19 44 14.8	8.727	7	21 30 47.69	2.4092	10 24 0.0	14.004
8	19 33 45.30	2.5628	19 35 26.8	8.872	8	21 33 12.14	2.4057	10 9 58.3	14.062
9	19 36 19.00	2.5605	19 26 30.2	9.015	9	21 35 36.38	2.4023	9 55 52.6	14.127
10	19 38 52.56	2.5580	19 17 25.0	9.157	10	21 38 0.42	2.3990	9 41 43.1	14.189
11	19 41 25.96	2.5554	19 8 11.4	9.297	11	21 40 24.26	2.3956	9 27 29.9	14.250
12	19 43 59.21	2.5529	18 58 49.4	9.437	12	21 42 47.89	2.3922	9 13 13.1	14.309
13	19 46 32.31	2.5502	18 49 19.0	9.575	13	21 45 11.33	2.3890	8 58 52.8	14.367
14	19 49 5.24	2.5475	18 39 40.4	9.712	14	21 47 34.57	2.3857	8 44 29.1	14.422
15	19 51 38.01	2.5447	18 29 53.6	9.848	15	21 49 57.62	2.3825	8 30 2.1	14.476
16	19 54 10.61	2.5419	18 19 58.6	9.983	16	21 52 20.47	2.3792	8 15 32.0	14.528
17	19 56 43.04	2.5390	18 9 55.6	10.116	17	21 54 43.13	2.3761	8 0 58.8	14.577
18	19 59 15.29	2.5361	17 59 44.7	10.247	18	21 57 5.60	2.3729	7 46 22.8	14.624
19	20 1 47.37	2.5331	17 49 25.9	10.377	19	21 59 27.88	2.3698	7 31 43.9	14.671
20	20 4 19.26	2.5300	17 38 59.4	10.507	20	22 1 49.98	2.3667	7 17 2.3	14.714
21	20 6 50.97	2.5269	17 28 25.1	10.635	21	22 4 11.89	2.3637	7 2 18.2	14.755
22	20 9 22.49	2.5238	17 17 43.2	10.761	22	22 6 33.62	2.3607	6 47 31.7	14.795
23	20 11 53.83	2.5207	17 6 53.8	10.886	23	22 8 55.17	2.3577	6 32 42.8	14.834
24	20 14 24.97	2.5174	S. 16 55 56.9	11.009	24	22 11 16.54	2.3547	S. 6 17 51.6	14.870

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 21.					WEDNESDAY 23.				
0	22 11 16.54	2.3547	S. 6 17 51.6	14.870	0	0 1 48.16	2.2694	N. 5 41 40.2	14.431
1	22 13 37.74	2.3519	6 2 58.4	14.903	1	0 4 4.31	2.2688	5 56 4.6	14.381
2	22 15 58.77	2.3491	5 48 3.2	14.935	2	0 6 20.42	2.2682	6 10 25.9	14.328
3	22 18 19.63	2.3462	5 33 6.2	14.965	3	0 8 36.50	2.2677	6 24 44.0	14.275
4	22 20 40.32	2.3434	5 18 7.4	14.994	4	0 10 52.55	2.2673	6 38 58.9	14.221
5	22 23 0.84	2.3407	5 3 6.9	15.020	5	0 13 8.58	2.2670	6 53 10.5	14.165
6	22 25 21.21	2.3381	4 48 5.0	15.044	6	0 15 24.59	2.2666	7 7 18.7	14.107
7	22 27 41.41	2.3354	4 33 1.6	15.067	7	0 17 40.57	2.2663	7 21 23.4	14.048
8	22 30 1.46	2.3328	4 17 56.9	15.087	8	0 19 56.54	2.2660	7 35 24.5	13.987
9	22 32 21.35	2.3302	4 2 51.1	15.106	9	0 22 12.49	2.2657	7 49 21.9	13.926
10	22 34 41.09	2.3277	3 47 44.2	15.122	10	0 24 28.43	2.2656	8 3 15.6	13.863
11	22 37 0.68	2.3252	3 32 36.4	15.137	11	0 26 44.36	2.2654	8 17 5.5	13.798
12	22 39 20.12	2.3228	3 17 27.7	15.151	12	0 29 0.28	2.2652	8 30 51.4	13.732
13	22 41 39.42	2.3205	3 2 18.3	15.161	13	0 31 16.19	2.2652	8 44 33.4	13.665
14	22 43 58.58	2.3183	2 47 8.4	15.170	14	0 33 32.10	2.2652	8 58 11.2	13.596
15	22 46 17.61	2.3161	2 31 57.9	15.177	15	0 35 48.01	2.2652	9 11 44.9	13.527
16	22 48 36.51	2.3138	2 16 47.1	15.183	16	0 38 3.92	2.2652	9 25 14.4	13.456
17	22 50 55.27	2.3116	2 1 36.0	15.187	17	0 40 19.84	2.2653	9 38 39.6	13.384
18	22 53 13.90	2.3095	1 46 24.7	15.188	18	0 42 35.76	2.2653	9 52 0.5	13.311
19	22 55 32.41	2.3074	1 31 13.4	15.188	19	0 44 51.68	2.2654	10 5 16.9	13.235
20	22 57 50.79	2.3054	1 16 2.1	15.187	20	0 47 7.61	2.2657	10 18 28.7	13.158
21	23 0 9.06	2.3035	1 0 51.0	15.183	21	0 49 23.56	2.2659	10 31 35.9	13.082
22	23 2 27.21	2.3015	0 45 40.2	15.177	22	0 51 39.52	2.2661	10 44 38.5	13.003
23	23 4 45.24	2.2997	S. 0 30 29.8	15.170	23	0 53 55.49	2.2663	N. 10 57 36.3	12.923
TUESDAY 22.					THURSDAY 24.				
0	23 7 3.17	2.2979	S. 0 15 19.8	15.161	0	0 56 11.48	2.2667	N. 11 10 29.3	12.842
1	23 9 20.99	2.2961	S. 0 0 10.5	15.149	1	0 58 27.49	2.2670	11 23 17.4	12.761
2	23 11 38.70	2.2944	N. 0 14 58.1	15.137	2	1 0 43.52	2.2673	11 36 0.6	12.677
3	23 13 56.32	2.2927	0 30 5.9	15.122	3	1 2 59.57	2.2677	11 48 38.7	12.592
4	23 16 13.83	2.2911	0 45 12.8	15.106	4	1 5 15.64	2.2681	12 1 11.7	12.507
5	23 18 31.25	2.2896	1 0 18.6	15.087	5	1 7 31.74	2.2686	12 13 39.6	12.422
6	23 20 48.58	2.2881	1 15 23.3	15.068	6	1 9 47.87	2.2690	12 26 2.3	12.334
7	23 23 5.82	2.2866	1 30 26.8	15.047	7	1 12 4.02	2.2694	12 38 19.7	12.246
8	23 25 22.97	2.2852	1 45 28.9	15.023	8	1 14 20.20	2.2700	12 50 31.8	12.156
9	23 27 40.04	2.2838	2 0 29.6	14.999	9	1 16 36.42	2.2705	13 2 38.4	12.065
10	23 29 57.03	2.2825	2 15 28.8	14.973	10	1 18 52.66	2.2710	13 14 39.6	11.973
11	23 32 13.94	2.2812	2 30 26.3	14.944	11	1 21 8.94	2.2717	13 26 35.2	11.880
12	23 34 30.78	2.2801	2 45 22.1	14.914	12	1 23 25.26	2.2722	13 38 25.2	11.787
13	23 36 47.55	2.2789	3 0 16.0	14.883	13	1 25 41.61	2.2728	13 50 9.6	11.692
14	23 39 4.25	2.2777	3 15 8.0	14.850	14	1 27 58.00	2.2734	14 1 48.2	11.596
15	23 41 20.88	2.2767	3 29 58.0	14.815	15	1 30 14.42	2.2740	14 13 21.1	11.500
16	23 43 37.45	2.2757	3 44 45.8	14.778	16	1 32 30.88	2.2747	14 24 48.2	11.402
17	23 45 53.97	2.2748	3 59 31.4	14.741	17	1 34 47.38	2.2754	14 36 9.3	11.303
18	23 48 10.43	2.2738	4 14 14.7	14.701	18	1 37 3.93	2.2761	14 47 24.6	11.204
19	23 50 26.83	2.2729	4 28 55.5	14.659	19	1 39 20.51	2.2767	14 58 33.8	11.103
20	23 52 43.18	2.2722	4 43 33.8	14.617	20	1 41 37.13	2.2774	15 9 37.0	11.002
21	23 54 59.49	2.2715	4 58 9.6	14.573	21	1 43 53.80	2.2781	15 20 34.1	10.900
22	23 57 15.76	2.2707	5 12 42.6	14.527	22	1 46 10.50	2.2788	15 31 25.0	10.797
23	23 59 31.98	2.2700	5 27 12.9	14.480	23	1 48 27.25	2.2796	15 42 9.7	10.693
24	0 1 48.16	2.2694	N. 5 41 40.2	14.431	24	1 50 44.05	2.2803	N. 15 52 48.2	10.589

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 25.					SUNDAY 27.				
0	1 50 44.05	2.2803	N. 15 52 48.2	10.589	0	3 40 51.59	2.3002	N. 22 8 27.4	4.886
1	1 53 0.89	2.2810	16 3 20.4	10.483	1	3 43 9.59	2.2999	22 13 16.7	4.758
2	1 55 17.77	2.2817	16 13 46.2	10.377	2	3 45 27.58	2.2996	22 17 58.4	4.632
3	1 57 34.69	2.2824	16 24 5.7	10.271	3	3 47 45.54	2.2992	22 22 32.5	4.504
4	1 59 51.66	2.2832	16 34 18.7	10.163	4	3 50 3.48	2.2987	22 26 58.9	4.376
5	2 2 8.67	2.2838	16 44 25.2	10.054	5	3 52 21.39	2.2982	22 31 17.6	4.248
6	2 4 25.72	2.2846	16 54 25.2	9.946	6	3 54 39.27	2.2977	22 35 28.7	4.121
7	2 6 42.82	2.2853	17 4 18.7	9.836	7	3 56 57.12	2.2972	22 39 32.1	3.993
8	2 8 59.96	2.2861	17 14 5.5	9.724	8	3 59 14.94	2.2966	22 43 27.8	3.865
9	2 11 17.15	2.2868	17 23 45.6	9.612	9	4 1 32.71	2.2959	22 47 15.9	3.737
10	2 13 34.38	2.2875	17 33 19.0	9.501	10	4 3 50.45	2.2952	22 50 56.3	3.610
11	2 15 51.65	2.2882	17 42 45.7	9.388	11	4 6 8.14	2.2945	22 54 29.1	3.482
12	2 18 8.96	2.2889	17 52 5.6	9.275	12	4 8 25.79	2.2937	22 57 54.2	3.354
13	2 20 26.32	2.2896	18 1 18.7	9.162	13	4 10 43.39	2.2928	23 1 11.6	3.227
14	2 22 43.71	2.2902	18 10 25.0	9.047	14	4 13 0.93	2.2919	23 4 21.4	3.099
15	2 25 1.15	2.2910	18 19 24.3	8.931	15	4 15 18.42	2.2910	23 7 23.5	2.972
16	2 27 18.63	2.2917	18 28 16.7	8.816	16	4 17 35.85	2.2900	23 10 18.0	2.844
17	2 29 36.15	2.2923	18 37 2.2	8.700	17	4 19 53.22	2.2890	23 13 4.8	2.717
18	2 31 53.71	2.2929	18 45 40.7	8.582	18	4 22 10.53	2.2879	23 15 44.0	2.590
19	2 34 11.30	2.2935	18 54 12.1	8.465	19	4 24 27.77	2.2867	23 18 15.6	2.463
20	2 36 28.93	2.2941	19 2 36.5	8.347	20	4 26 44.94	2.2856	23 20 39.6	2.336
21	2 38 46.59	2.2947	19 10 53.8	8.228	21	4 29 2.04	2.2843	23 22 55.9	2.208
22	2 41 4.29	2.2953	19 19 3.9	8.109	22	4 31 19.06	2.2830	23 25 4.6	2.082
23	2 43 22.03	2.2958	N. 19 27 6.9	7.990	23	4 33 36.00	2.2817	N. 23 27 5.7	1.956
SATURDAY 26.					MONDAY 28.				
0	2 45 39.79	2.2963	N. 19 35 2.7	7.870	0	4 35 52.86	2.2803	N. 23 28 59.3	1.830
1	2 47 57.59	2.2968	19 42 51.3	7.750	1	4 38 9.64	2.2788	23 30 45.3	1.703
2	2 50 15.41	2.2973	19 50 32.7	7.629	2	4 40 26.32	2.2773	23 32 23.7	1.577
3	2 52 33.27	2.2978	19 58 6.8	7.507	3	4 42 42.92	2.2759	23 33 54.5	1.451
4	2 54 51.15	2.2982	20 5 33.6	7.386	4	4 44 59.43	2.2743	23 35 17.8	1.326
5	2 57 9.05	2.2986	20 12 53.1	7.264	5	4 47 15.83	2.2726	23 36 33.6	1.200
6	2 59 26.98	2.2990	20 20 5.3	7.142	6	4 49 32.14	2.2710	23 37 41.8	1.075
7	3 1 44.93	2.2993	20 27 10.1	7.018	7	4 51 48.35	2.2692	23 38 42.6	0.951
8	3 4 2.90	2.2997	20 34 7.5	6.895	8	4 54 4.45	2.2674	23 39 35.9	0.826
9	3 6 20.89	2.3000	20 40 57.5	6.772	9	4 56 20.44	2.2656	23 40 21.7	0.701
10	3 8 38.90	2.3002	20 47 40.1	6.647	10	4 58 36.32	2.2637	23 41 0.0	0.577
11	3 10 56.92	2.3004	20 54 15.2	6.523	11	5 0 52.09	2.2618	23 41 30.9	0.453
12	3 13 14.95	2.3007	21 0 42.9	6.399	12	5 3 7.74	2.2598	23 41 54.4	0.330
13	3 15 33.00	2.3008	21 7 3.1	6.274	13	5 5 23.27	2.2578	23 42 10.5	0.207
14	3 17 51.05	2.3009	21 13 15.8	6.149	14	5 7 38.68	2.2557	23 42 19.2	+ 0.084
15	3 20 9.11	2.3011	21 19 21.0	6.024	15	5 9 53.96	2.2537	23 42 20.6	- 0.038
16	3 22 27.18	2.3011	21 25 18.7	5.898	16	5 12 9.12	2.2515	23 42 14.6	0.161
17	3 24 45.24	2.3011	21 31 8.8	5.772	17	5 14 24.14	2.2492	23 42 1.3	0.282
18	3 27 3.31	2.3012	21 36 51.4	5.647	18	5 16 39.03	2.2470	23 41 40.7	0.403
19	3 29 21.38	2.3011	21 42 26.4	5.520	19	5 18 53.78	2.2447	23 41 12.9	0.524
20	3 31 39.44	2.3009	21 47 53.8	5.393	20	5 21 8.40	2.2424	23 40 37.8	0.645
21	3 33 57.49	2.3008	21 53 13.6	5.267	21	5 23 22.87	2.2400	23 39 55.5	0.765
22	3 36 15.54	2.3007	21 58 25.8	5.140	22	5 25 37.20	2.2376	23 39 6.0	0.885
23	3 38 33.57	2.3004	22 3 30.4	5.013	23	5 27 51.38	2.2351	23 38 9.3	1.004
24	3 40 51.59	2.3002	N. 22 8 27.4	4.886	24	5 30 5.41	2.2326	N. 23 37 5.5	1.122

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.										
TUESDAY 29.					THURSDAY 31.														
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"										
1	5 30 5.41	2.2326	N.23 37 5.5	1.122	1	7 13 43.81	2.0771	N.20 36 9.5	6.187										
2	5 32 19.29	2.2301	23 35 54.6	1.241	2	7 15 48.33	2.0735	20 29 55.6	6.277										
3	5 34 33.02	2.2274	23 34 36.6	1.359	3	7 17 52.63	2.0698	20 23 36.3	6.367										
4	5 36 46.58	2.2248	23 33 11.5	1.477	4	7 19 56.71	2.0662	20 17 11.6	6.455										
5	5 38 59.99	2.2222	23 31 39.3	1.594	5	7 22 0.58	2.0627	20 10 41.7	6.543										
6	5 41 13.24	2.2194	23 30 0.2	1.710	6	7 24 4.23	2.0590	20 4 6.5	6.631										
7	5 43 26.32	2.2166	23 28 14.1	1.827	7	7 26 7.66	2.0554	19 57 26.0	6.717										
8	5 45 39.23	2.2138	23 26 21.0	1.942	8	7 28 10.88	2.0518	19 50 40.4	6.802										
9	5 47 51.98	2.2110	23 24 21.0	2.057	9	7 30 13.88	2.0482	19 43 49.7	6.887										
10	5 50 4.55	2.2081	23 22 14.1	2.172	10	7 32 16.67	2.0447	19 36 53.9	6.972										
11	5 52 16.95	2.2052	23 20 0.3	2.287	11	7 34 19.24	2.0411	19 29 53.1	7.056										
12	5 54 29.18	2.2023	23 17 39.7	2.399	12	7 36 21.60	2.0376	19 22 47.2	7.139										
13	5 56 41.23	2.1993	23 15 12.4	2.512	13	7 38 23.75	2.0340	19 15 36.4	7.221										
14	5 58 53.10	2.1963	23 12 38.2	2.626	14	7 40 25.68	2.0304	19 8 20.7	7.302										
15	6 1 4.79	2.1933	23 9 57.3	2.737	15	7 42 27.40	2.0269	19 1 0.1	7.384										
16	6 3 16.30	2.1902	23 7 9.7	2.849	16	7 44 28.91	2.0233	18 53 34.6	7.465										
17	6 5 27.62	2.1871	23 4 15.4	2.960	17	7 46 30.20	2.0198	18 46 4.3	7.544										
18	6 7 38.75	2.1840	23 1 14.5	3.070	18	7 48 31.29	2.0163	18 38 29.3	7.623										
19	6 9 49.70	2.1809	22 58 7.0	3.180	19	7 50 32.16	2.0128	18 30 49.6	7.701										
20	6 12 0.46	2.1777	22 54 52.9	3.290	20	7 52 32.83	2.0094	18 23 5.2	7.777										
21	6 14 11.02	2.1744	22 51 32.2	3.398	21	7 54 33.29	2.0059	18 15 16.3	7.854										
22	6 16 21.39	2.1712	22 48 5.1	3.506	22	7 56 33.54	2.0025	18 7 22.7	7.931										
23	6 18 31.57	2.1680	22 44 31.5	3.614	23	7 58 33.59	1.9992	17 59 24.6	8.006										
24	6 20 41.55	2.1647	N.22 40 51.4	3.721	24	8 0 33.44	1.9957	N.17 51 22.0	8.081										
WEDNESDAY 30.					FRIDAY, SEPTEMBER 1.														
0	6 22 51.33	2.1613	N.22 37 5.0	3.827	0	8 2 33.08	1.9923	N.17 43 14.9	8.155										
1	6 25 0.91	2.1580	22 33 12.2	3.932	PHASES OF THE MOON.														
2	6 27 10.29	2.1547	22 29 13.1	4.037															
3	6 29 19.47	2.1513	22 25 7.7	4.142															
4	6 31 28.45	2.1479	22 20 56.0	4.246															
5	6 33 37.22	2.1444	22 16 38.2	4.349	<table><tr><td></td><td>d h m</td></tr><tr><td>☉ New Moon . . . . . Aug.</td><td>5 23 47.9</td></tr><tr><td>☾ First Quarter . . . . .</td><td>13 23 54.1</td></tr><tr><td>☾ Full Moon . . . . .</td><td>20 16 45.0</td></tr><tr><td>☾ Last Quarter . . . . .</td><td>27 11 56.9</td></tr></table>						d h m	☉ New Moon . . . . . Aug.	5 23 47.9	☾ First Quarter . . . . .	13 23 54.1	☾ Full Moon . . . . .	20 16 45.0	☾ Last Quarter . . . . .	27 11 56.9
	d h m																		
☉ New Moon . . . . . Aug.	5 23 47.9																		
☾ First Quarter . . . . .	13 23 54.1																		
☾ Full Moon . . . . .	20 16 45.0																		
☾ Last Quarter . . . . .	27 11 56.9																		
6	6 35 45.78	2.1410	22 12 14.1	4.452	<table><tr><td></td><td>d h</td></tr><tr><td>☾ Apogee . . . . . Aug.</td><td>6 10.3</td></tr><tr><td>☾ Perigee . . . . .</td><td>20 9.6</td></tr></table>						d h	☾ Apogee . . . . . Aug.	6 10.3	☾ Perigee . . . . .	20 9.6				
	d h																		
☾ Apogee . . . . . Aug.	6 10.3																		
☾ Perigee . . . . .	20 9.6																		
7	6 37 54.14	2.1376	22 7 43.9	4.554															
8	6 40 2.29	2.1341	22 3 7.6	4.655															
9	6 42 10.23	2.1306	21 58 25.3	4.756															
10	6 44 17.96	2.1271	21 53 36.9	4.856															
11	6 46 25.48	2.1236	21 48 42.6	4.955															
12	6 48 32.79	2.1201	21 43 42.3	5.054															
13	6 50 39.89	2.1165	21 38 36.1	5.152															
14	6 52 46.77	2.1129	21 33 24.0	5.250															
15	6 54 53.44	2.1094	21 28 6.1	5.347															
16	6 56 59.90	2.1058	21 22 42.4	5.442															
17	6 59 6.14	2.1022	21 17 13.0	5.537															
18	7 1 12.17	2.0987	21 11 37.9	5.632															
19	7 3 17.98	2.0951	21 5 57.1	5.727															
20	7 5 23.58	2.0915	21 0 10.6	5.821															
21	7 7 28.96	2.0879	20 54 18.6	5.913															
22	7 9 34.13	2.0843	20 48 21.1	6.005															
23	7 11 39.08	2.0807	20 42 18.0	6.097															
24	7 13 43.81	2.0771	N.20 36 9.5	6.187															

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Fomalhaut W.	101 14 14	3366	102 37 9	3380	103 59 48	3396	105 22 9	3412
	α Pegasi W.	81 54 29	3027	83 24 8	3035	84 53 37	3044	86 22 55	3052
	α Arietis W.	38 28 33	2946	39 59 54	2951	41 31 8	2958	43 2 14	2963
	VENUS E.	42 31 30	3358	41 8 26	3370	39 45 35	3381	38 22 57	3392
	SUN E.	54 59 38	3252	53 34 30	3263	52 9 35	3273	50 44 52	3282
2	α Pegasi W.	93 46 56	3092	95 15 15	3101	96 43 24	3108	98 11 24	3115
	α Arietis W.	50 35 54	2993	52 6 16	2998	53 36 31	3004	55 6 39	3009
	SUN E.	43 44 5	3330	42 20 28	3338	40 57 1	3347	39 33 44	3355
3	α Arietis W.	62 35 45	3034	64 5 16	3038	65 34 42	3042	67 4 3	3047
	Aldebaran W.	30 9 2	3141	31 36 22	3135	33 3 49	3131	34 31 21	3127
	SUN E.	32 39 42	3397	31 17 22	3405	29 55 11	3413	28 33 9	3422
4	α Arietis W.	74 29 33	3065	75 58 26	3068	77 27 15	3071	78 56 0	3073
	Aldebaran W.	41 49 55	3113	43 17 43	3117	44 45 32	3116	46 13 22	3116
	SUN E.	21 45 35	3472	20 24 40	3486	19 4 0	3500	17 43 36	3518
7	SUN W.	11 46 17	3636	13 4 12	3602	14 22 44	3575	15 41 46	3552
	Spica E.	56 42 12	3080	55 13 38	3080	53 45 4	3079	52 16 29	3078
	JUPITER E.	67 10 28	3137	65 43 3	3137	64 15 38	3137	62 48 13	3136
8	SUN W.	22 21 49	3487	23 42 28	3478	25 3 17	3471	26 24 14	3463
	Spica E.	44 53 13	3072	43 24 29	3069	41 55 42	3067	40 26 52	3065
	JUPITER E.	55 30 54	3131	54 3 22	3130	52 35 49	3129	51 8 14	3127
	Antares E.	90 25 54	3067	88 57 4	3065	87 28 11	3062	85 59 15	3059
	SATURN E.	99 44 15	3057	98 15 13	3056	96 46 9	3053	95 17 2	3050
9	SUN W.	33 10 59	3430	34 32 42	3423	35 54 32	3416	37 16 30	3409
	Spica E.	33 2 0	3052	31 32 51	3049	30 3 39	3046	28 34 23	3043
	JUPITER E.	43 49 48	3118	42 22 0	3115	40 54 9	3114	39 26 16	3112
	Antares E.	78 33 35	3042	77 4 14	3037	75 34 47	3033	74 5 15	3028
	SATURN E.	87 50 27	3033	86 20 55	3028	84 51 17	3023	83 21 33	3019
10	SUN W.	44 8 19	3374	45 31 5	3365	46 54 1	3358	48 17 6	3349
	Antares E.	66 35 59	3000	65 5 46	2994	63 35 26	2987	62 4 57	2981
	SATURN E.	75 51 22	2991	74 20 58	2985	72 50 27	2978	71 19 47	2971
11	SUN W.	55 15 2	3303	56 39 10	3293	58 3 30	3282	59 28 2	3271
	Antares E.	54 30 16	2942	52 58 50	2932	51 27 12	2921	49 55 23	2914
	SATURN E.	63 44 7	2932	62 12 29	2923	60 40 39	2914	59 8 38	2901
	α Aquilæ E.	106 58 4	3461	105 36 56	3445	104 15 30	3428	102 53 45	3412
12	SUN W.	66 34 0	3213	67 59 54	3200	69 26 3	3187	70 52 28	3173
	Antares E.	42 13 14	2864	40 40 9	2853	39 6 50	2842	37 33 16	2831
	SATURN E.	51 25 22	2852	49 52 2	2841	48 18 27	2829	46 44 37	2818
	α Aquilæ E.	96 0 37	3338	94 37 9	3324	93 13 25	3311	91 49 26	3297
13	SUN W.	78 8 43	3101	79 36 51	3086	81 5 18	3070	82 34 4	3054
	MARS W.	34 7 7	3034	35 36 38	3014	37 6 33	2995	38 36 52	2977
	SATURN E.	38 51 29	2754	37 16 1	2741	35 40 15	2727	34 4 11	2713
	α Aquilæ E.	84 45 45	3236	83 20 19	3225	81 54 40	3214	80 28 48	3204

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	Fomalhaut	W.	106 44 12	3489	108 5 56	3446	109 27 21	3463	110 48 26	3481
	α Pegasi	W.	87 52 3	3060	89 21 1	3069	90 49 49	3077	92 18 27	3084
	α Arietis	W.	44 33 13	2969	46 4 4	2975	47 34 48	2981	49 5 25	2987
	VENUS	E.	37 0 31	3403	35 38 18	3414	34 16 17	3424	32 54 28	3435
	SUN	E.	49 20 20	3293	47 56 0	3302	46 31 51	3312	45 7 53	3320
2	α Pegasi	W.	99 39 15	3123	101 6 57	3131	102 34 29	3138	104 1 53	3146
	α Arietis	W.	56 36 41	3014	58 6 36	3019	59 36 25	3024	61 6 8	3029
	SUN	E.	38 10 36	3364	36 47 38	3372	35 24 50	3380	34 2 11	3389
3	α Arietis	W.	68 33 18	3051	70 2 28	3054	71 31 34	3057	73 0 36	3061
	Aldebaran	W.	35 58 58	3124	37 26 38	3121	38 54 22	3119	40 22 8	3119
	SUN	E.	27 11 17	3431	25 49 35	3439	24 28 3	3450	23 6 43	3461
4	α Arietis	W.	80 24 42	3076	81 53 21	3079	83 21 56	3082	84 50 28	3083
	Aldebaran	W.	47 41 12	3116	49 9 2	3115	50 36 53	3115	52 4 44	3116
	SUN	E.	16 23 32	3539	15 3 51	3566	13 44 40	3601	12 26 7	3647
7	SUN	W.	17 1 13	3534	18 21 0	3519	19 41 3	3506	21 1 20	3496
	Spica	E.	50 47 53	3077	49 19 15	3076	47 50 36	3074	46 21 55	3073
	JUPITER	E.	61 20 47	3135	59 53 20	3135	58 25 53	3133	56 58 24	3133
8	SUN	W.	27 45 20	3455	29 6 34	3449	30 27 55	3443	31 49 23	3436
	Spica	E.	38 58 0	3063	37 29 5	3060	36 0 7	3057	34 31 5	3055
	JUPITER	E.	49 40 37	3125	48 12 58	3124	46 45 17	3122	45 17 34	3119
	Antares	E.	84 30 15	3056	83 1 12	3052	81 32 4	3049	80 2 52	3045
	SATURN	E.	93 47 51	3047	92 18 37	3043	90 49 18	3040	89 19 55	3036
9	SUN	W.	38 38 36	3403	40 0 49	3395	41 23 11	3388	42 45 41	3381
	Spica	E.	27 5 4	3040	25 35 41	3038	24 6 15	3035	22 36 46	3033
	JUPITER	E.	37 58 21	3110	36 30 24	3108	35 2 24	3106	33 34 22	3105
	Antares	E.	72 35 37	3023	71 5 53	3018	69 36 2	3012	68 6 4	3006
	SATURN	E.	81 51 44	3014	80 21 49	3009	78 51 47	3005	77 21 38	2997
10	SUN	W.	49 40 21	3341	51 3 45	3332	52 27 20	3323	53 51 5	3313
	Antares	E.	60 34 20	2973	59 3 34	2965	57 32 38	2958	56 1 32	2950
	SATURN	E.	69 48 58	2964	68 18 0	2956	66 46 52	2949	65 15 35	2940
11	SUN	W.	60 52 47	3260	62 17 45	3249	63 42 56	3237	65 8 21	3225
	Antares	E.	48 23 22	2905	46 51 9	2895	45 18 44	2885	43 46 6	2874
	SATURN	E.	57 36 24	2894	56 3 58	2883	54 31 20	2874	52 58 28	2863
	α Aquilæ	E.	101 31 42	3396	100 9 21	3381	98 46 43	3366	97 23 48	3352
12	SUN	W.	72 19 9	3160	73 46 6	3145	75 13 21	3131	76 40 53	3116
	Antares	E.	35 59 28	2819	34 25 25	2808	32 51 7	2796	31 16 34	2783
	SATURN	E.	45 10 32	2805	43 36 11	2793	42 1 34	2780	40 26 40	2767
	α Aquilæ	E.	90 25 11	3284	89 0 41	3272	87 35 57	3259	86 10 58	3247
13	SUN	W.	84 3 10	3038	85 32 36	3022	87 2 22	3005	88 32 29	2987
	MARS	W.	40 7 34	2958	41 38 40	2939	43 10 10	2920	44 42 4	2900
	SATURN	E.	32 27 48	2699	30 51 7	2685	29 14 7	2671	27 36 48	2657
	α Aquilæ	E.	79 2 44	3195	77 36 29	3186	76 10 3	3178	74 43 27	3169



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
14	SUN W.	90 2 58	2970	91 33 48	2953	93 5 0	2935	94 36 35	2917
	MARS W.	46 14 23	2881	47 47 6	2862	49 20 13	2843	50 53 45	2825
	Spica W.	29 2 3	2646	30 39 56	2628	32 18 13	2610	33 56 54	2592
	$\alpha$ Aquilæ E.	73 16 41	3163	71 49 47	3157	70 22 46	3151	68 55 38	3148
	Fomalhaut E.	99 5 41	3092	97 37 22	3072	96 8 38	3053	94 39 31	3034
15	SUN W.	102 20 15	2825	103 54 11	2806	105 28 31	2787	107 3 16	2769
	MARS W.	58 47 37	2728	60 23 40	2709	62 0 8	2689	63 37 2	2670
	Spica W.	42 16 33	2502	43 57 44	2483	45 39 21	2465	47 21 24	2447
	JUPITER W.	31 13 39	2598	32 52 37	2574	34 32 7	2552	36 12 8	2530
	$\alpha$ Aquilæ E.	61 39 15	3146	60 12 1	3151	58 44 53	3158	57 17 54	3168
	Fomalhaut E.	87 8 14	2947	85 36 55	2931	84 5 16	2917	82 33 19	2902
	$\alpha$ Pegasi E.	107 1 36	2640	105 23 36	2621	103 45 9	2601	102 6 15	2581
16	SUN W.	115 3 12	2675	116 40 26	2656	118 18 5	2638	119 56 9	2620
	MARS W.	71 48 5	2574	73 27 36	2555	75 7 33	2536	76 47 56	2517
	Spica W.	55 58 6	2355	57 42 45	2338	59 27 49	2320	61 13 19	2302
	JUPITER W.	44 39 43	2426	46 22 41	2405	48 6 8	2387	49 50 2	2367
	Fomalhaut E.	74 49 19	2845	73 15 49	2835	71 42 7	2828	70 8 16	2822
	$\alpha$ Pegasi E.	93 45 6	2487	92 3 34	2469	90 21 37	2451	88 39 15	2434
17	MARS W.	85 16 15	2420	86 59 9	2411	88 42 28	2394	90 26 11	2378
	Spica W.	70 7 14	2217	71 55 16	2200	73 43 43	2181	75 32 34	2169
	JUPITER W.	58 36 21	2276	60 22 56	2259	62 9 56	2243	63 57 20	2226
	Fomalhaut E.	62 17 47	2818	60 43 43	2825	59 9 47	2832	57 36 1	2844
	$\alpha$ Pegasi E.	80 1 29	2354	78 16 48	2340	76 31 47	2326	74 46 26	2313
18	MARS W.	99 10 23	2304	100 56 17	2291	102 42 30	2279	104 29 1	2266
	Spica W.	84 42 29	2097	86 33 33	2085	88 24 56	2072	90 16 38	2061
	JUPITER W.	73 0 13	2152	74 49 53	2138	76 39 54	2126	78 30 13	2114
	Antares W.	39 11 6	2105	41 1 57	2092	42 53 8	2079	44 44 39	2066
	SATURN W.	29 59 46	2104	31 50 39	2090	33 41 53	2077	35 33 28	2064
	$\alpha$ Pegasi E.	65 55 21	2262	64 8 25	2254	62 21 18	2247	60 34 1	2243
	$\alpha$ Arietis E.	108 33 57	2119	106 43 27	2105	104 52 36	2093	103 1 26	2081
19	Spica W.	99 39 22	2011	101 32 39	2003	103 26 9	1996	105 19 49	1989
	JUPITER W.	87 46 8	2063	89 38 4	2055	91 30 12	2048	93 22 31	2042
	Antares W.	54 6 46	2014	55 59 58	2006	57 53 23	1999	59 46 59	1992
	SATURN W.	44 55 52	2012	46 49 8	2004	48 42 36	1996	50 36 16	1989
	$\alpha$ Pegasi E.	51 36 30	2241	49 49 4	2247	48 1 46	2235	46 14 40	2226
	$\alpha$ Arietis E.	93 41 14	2030	91 48 27	2022	89 55 27	2015	88 2 16	2009
20	Antares W.	69 17 16	1970	71 11 38	1968	73 6 3	1967	75 0 30	1966
	SATURN W.	60 6 53	1968	62 1 18	1965	63 55 47	1964	65 50 18	1964
	$\alpha$ Arietis E.	78 34 15	1989	76 40 23	1987	74 46 28	1986	72 52 32	1987
	Aldebaran E.	111 25 38	2002	109 32 7	2000	107 38 32	1998	105 44 54	1997
21	Antares W.	84 32 28	1977	86 26 39	1981	88 20 43	1986	90 14 39	1923
	SATURN W.	75 22 33	1974	77 16 48	1979	79 10 55	1984	81 4 54	1991
	$\alpha$ Aquilæ W.	39 10 23	3409	40 32 29	3304	41 56 36	3214	43 22 29	3115
	$\alpha$ Arietis E.	63 23 29	2001	61 29 57	2007	59 36 34	2014	57 43 21	2021
	Aldebaran E.	96 16 49	2005	94 23 23	2009	92 30 3	2014	90 36 51	2021

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
14	SUN W.	96 8 32	2899	97 40 52	2880	99 13 36	2862	100 46 43	2843
	MARS W.	52 27 41	2805	54 2 3	2786	55 36 49	2767	57 12 0	2747
	Spica W.	35 36 0	2574	37 15 31	2556	38 55 26	2538	40 35 47	2520
	α Aquilæ E.	67 28 26	3144	66 1 10	3142	64 33 51	3142	63 6 32	3143
	Fomalhaut E.	93 10 0	3015	91 40 6	2997	90 9 50	2980	88 39 12	2964
15	SUN W.	108 38 25	2749	110 14 0	2731	111 49 59	2712	113 26 23	2693
	MARS W.	65 14 22	2651	66 52 8	2631	68 30 21	2612	70 9 0	2593
	Spica W.	49 3 52	2428	50 46 47	2410	52 30 7	2391	54 13 54	2374
	JUPITER W.	37 52 39	2508	39 33 41	2487	41 15 12	2466	42 57 13	2445
	α Aquilæ E.	55 51 7	3181	54 24 35	3198	52 58 23	3165	51 32 33	3238
	Fomalhaut E.	81 1 3	2889	79 28 30	2876	77 55 41	2865	76 22 37	2854
	α Pegasi E.	100 26 54	2561	98 47 6	2543	97 6 52	2524	95 26 12	2505
16	SUN W.	121 34 37	2601	123 13 30	2584	124 52 47	2566	126 32 28	2550
	MARS W.	78 28 45	2499	80 10 0	2481	81 51 40	2463	83 33 45	2445
	Spica W.	62 59 15	2285	64 45 37	2268	66 32 24	2251	68 19 36	2233
	JUPITER W.	51 34 24	2348	53 19 13	2330	55 4 29	2311	56 50 12	2294
	Fomalhaut E.	68 34 17	2818	67 0 12	2815	65 26 4	2815	63 51 55	2815
	α Pegasi E.	86 56 29	2417	85 13 19	2401	83 29 45	2384	81 45 48	2369
17	MARS W.	92 10 17	2362	93 54 46	2347	95 39 37	2332	97 24 50	2318
	Spica W.	77 21 48	2154	79 11 25	2139	81 1 25	2125	82 51 46	2111
	JUPITER W.	65 45 9	2210	67 33 21	2195	69 21 56	2180	71 10 54	2166
	Fomalhaut E.	56 2 30	2858	54 29 17	2877	52 56 29	2900	51 24 10	2929
	α Pegasi E.	73 0 46	2301	71 14 48	2290	69 28 34	2279	67 42 4	2270
18	MARS W.	106 15 50	2255	108 2 56	2245	109 50 17	2235	111 37 53	2225
	Spica W.	92 8 38	2050	94 0 55	2039	95 53 29	2029	97 46 18	2019
	JUPITER W.	80 20 51	2103	82 11 46	2092	84 2 58	2081	85 54 26	2072
	Antares W.	46 36 30	2055	48 28 39	2044	50 21 5	2033	52 13 48	2023
	SATURN W.	37 25 22	2053	39 17 34	2041	41 10 4	2031	43 2 50	2021
	α Pegasi E.	58 46 37	2239	56 59 8	2237	55 11 35	2236	53 24 1	2238
	α Arietis E.	101 9 57	2069	99 18 10	2059	97 26 7	2048	95 33 48	2039
19	Spica W.	107 13 40	1984	109 7 40	1979	111 1 47	1975	112 56 1	1972
	JUPITER W.	95 15 0	2036	97 7 38	2032	99 0 23	2027	100 53 15	2024
	Antares W.	61 40 46	1986	63 34 42	1981	65 28 47	1976	67 22 59	1973
	SATURN W.	52 30 7	1984	54 24 7	1978	56 18 16	1974	58 12 32	1970
	α Pegasi E.	44 27 51	2280	42 41 22	2298	40 55 19	2319	39 9 47	2345
	α Arietis E.	86 8 55	2005	84 15 25	1998	82 21 48	1994	80 28 4	1991
20	Antares W.	76 54 58	1967	78 49 25	1966	80 43 50	1970	82 38 11	1973
	SATURN W.	67 44 49	1964	69 39 20	1966	71 33 48	1968	73 28 13	1971
	α Arietis E.	70 58 37	1988	69 4 44	1990	67 10 54	1993	65 17 9	1996
	Aldebaran E.	103 51 15	1996	101 57 35	1998	100 3 57	1999	98 10 21	2001
21	Antares W.	92 8 25	2000	94 2 0	2007	95 55 24	2015	97 48 35	2025
	SATURN W.	82 58 43	1997	84 52 22	2005	86 45 49	2014	88 39 2	2022
	α Aquilæ W.	44 49 56	3067	46 18 46	3008	47 48 49	2957	49 19 56	2913
	α Arietis E.	55 50 20	2030	53 57 32	2039	52 4 58	2049	50 12 40	2061
	Aldebaran E.	88 43 49	2027	86 50 57	2035	84 58 18	2044	83 5 52	2053

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
22	Antares W.	99 41 31	2034	101 34 12	2044	103 26 37	2055	105 18 45	2068
	SATURN W.	90 32 2	2032	92 24 47	2042	94 17 15	2053	96 9 26	2065
	α Aquilæ W.	50 51 58	2876	52 24 47	2844	53 58 18	2818	55 32 23	2796
	α Arietis E.	48 20 40	2072	46 28 58	2086	44 37 37	2100	42 46 38	2115
	Aldebaran E.	81 13 40	2063	79 21 44	2073	77 30 4	2085	75 38 42	2098
23	α Aquilæ W.	63 28 25	2737	65 4 16	2735	66 40 10	2734	68 16 5	2735
	Fomalhaut W.	39 32 25	3431	40 54 6	3351	42 17 18	3284	43 41 48	3228
	Aldebaran E.	66 26 53	2169	64 37 38	2184	62 48 47	2202	61 0 22	2218
	Pollux E.	108 19 0	2184	106 30 9	2198	104 41 38	2212	102 53 29	2227
24	α Aquilæ W.	76 14 28	2767	77 49 39	2779	79 24 35	2791	80 59 15	2804
	Fomalhaut W.	50 58 11	3051	52 27 21	3030	53 56 56	3015	55 26 50	3004
	Aldebaran E.	52 4 56	2313	50 19 16	2335	48 34 7	2355	46 49 28	2378
	Pollux E.	93 58 33	2310	92 12 48	2327	90 27 28	2345	88 42 34	2364
	SUN E.	133 37 20	2588	131 58 8	2605	130 19 20	2624	128 40 58	2643
25	α Aquilæ W.	88 47 52	2885	90 20 30	2904	91 52 44	2924	93 24 33	2944
	Fomalhaut W.	62 58 48	2985	64 29 20	2987	65 59 49	2991	67 30 13	2996
	α Pegasi W.	41 10 15	2726	42 46 20	2725	44 22 27	2726	45 58 32	2729
	Aldebaran E.	38 14 21	2497	36 33 3	2523	34 52 22	2551	33 12 19	2580
	Pollux E.	80 4 46	2458	78 22 34	2477	76 40 49	2497	74 59 32	2517
	SUN E.	120 35 29	2738	118 59 40	2759	117 24 18	2779	115 49 22	2798
26	Fomalhaut W.	75 0 5	3040	76 29 28	3052	77 58 37	3064	79 27 31	3076
	α Pegasi W.	53 57 24	2763	55 32 40	2774	57 7 42	2785	58 42 30	2795
	Pollux E.	66 39 56	2615	65 1 22	2636	63 23 16	2656	61 45 37	2675
	SUN E.	108 1 8	2897	106 28 45	2916	104 56 47	2935	103 25 13	2954
27	Fomalhaut W.	86 47 54	3148	88 15 5	3163	89 41 58	3179	91 8 32	3196
	α Pegasi W.	66 32 44	2856	68 5 59	2869	69 38 57	2882	71 11 39	2894
	Pollux E.	53 43 57	2775	52 8 56	2795	50 34 21	2815	49 0 12	2835
	SUN E.	95 53 19	3047	94 24 5	3065	92 55 12	3082	91 26 41	3099
28	Fomalhaut W.	98 16 23	3282	99 40 56	3300	101 5 7	3319	102 28 57	3337
	α Pegasi W.	78 51 6	2958	80 22 11	2970	81 53 1	2982	83 23 36	2995
	α Arietis W.	35 20 55	2885	36 53 33	2894	38 25 59	2904	39 58 13	2912
	Pollux E.	41 16 4	2939	39 44 35	2962	38 13 34	2984	36 43 1	3008
	SUN E.	84 9 7	3179	82 42 33	3195	81 16 18	3209	79 50 20	3224
29	α Pegasi W.	90 52 45	3053	92 21 52	3064	93 50 46	3074	95 19 27	3085
	α Arietis W.	47 36 31	2958	49 7 36	2967	50 38 30	2975	52 9 14	2984
	SUN E.	72 44 35	3289	71 20 11	3302	69 56 2	3313	68 32 6	3324
30	α Pegasi W.	102 39 41	3135	104 7 8	3145	105 34 23	3154	107 1 27	3164
	α Arietis W.	59 40 22	3022	61 10 8	3028	62 39 46	3034	64 9 16	3041
	Aldebaran W.	27 14 59	3144	28 42 15	3138	30 9 39	3133	31 37 9	3129
	SUN E.	61 35 28	3374	60 12 42	3383	58 50 6	3392	57 27 40	3400
31	α Arietis W.	71 35 0	3066	73 3 51	3071	74 32 36	3075	76 1 16	3078
	Aldebaran W.	38 55 23	3183	40 23 5	3122	41 50 48	3122	43 18 31	3122
	SUN E.	50 37 42	3436	49 16 6	3442	47 54 37	3448	46 33 15	3454

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
22	Antares W.	107 10 34	2080	109 2 4	2092	110 53 15	2106	112 44 5	2120
	SATURN W.	98 1 19	2077	99 52 53	2090	101 44 7	2103	103 35 1	2118
	α Aquilæ W.	57 6 56	2778	58 41 53	2763	60 17 10	2751	61 52 42	2743
	α Arietis E.	40 56 2	2132	39 5 52	2149	37 16 8	2169	35 26 53	2189
	Aldebaran E.	73 47 39	2111	71 56 56	2124	70 6 33	2138	68 16 32	2153
23	α Aquilæ W.	69 51 59	2738	71 27 48	2743	73 3 31	2750	74 39 5	2758
	Fomalhaut W.	45 7 24	3179	46 33 58	3137	48 1 23	3102	49 29 30	3074
	Aldebaran E.	59 12 22	2237	57 24 49	2255	55 37 43	2274	53 51 5	2294
	Pollux E.	101 5 42	2243	99 18 19	2259	97 31 19	2276	95 44 44	2292
24	α Aquilæ W.	82 33 38	2818	84 7 42	2833	85 41 27	2849	87 14 51	2867
	Fomalhaut W.	56 56 58	2995	58 27 17	2989	59 57 44	2985	61 28 15	2984
	Aldebaran E.	45 5 21	2400	43 21 46	2422	41 38 43	2447	39 56 15	2471
	Pollux E.	86 58 7	2382	85 14 6	2401	83 30 32	2419	81 47 25	2439
	SUN E.	127 3 1	2662	125 25 30	2681	123 48 24	2700	122 11 44	2719
25	α Aquilæ W.	94 55 56	2965	96 26 52	2987	97 57 21	3009	99 27 22	3033
	Fomalhaut W.	69 0 31	3003	70 30 40	3010	72 0 40	3019	73 30 29	3030
	α Pegasi W.	47 34 34	2733	49 10 30	2739	50 46 18	2747	52 21 56	2754
	Aldebaran E.	31 32 56	2610	29 54 15	2643	28 16 18	2678	26 39 9	2716
	Pollux E.	73 18 42	2536	71 38 19	2556	69 58 24	2576	68 18 56	2596
	SUN E.	114 14 52	2818	112 40 48	2838	111 7 9	2858	109 33 56	2877
26	Fomalhaut W.	80 56 10	3090	82 24 32	3104	83 52 37	3119	85 20 24	3133
	α Pegasi W.	60 17 4	2807	61 51 23	2819	63 25 26	2831	64 59 13	2844
	Pollux E.	60 8 24	2695	58 31 38	2715	56 55 18	2735	55 19 24	2755
	SUN E.	101 54 3	2973	100 23 17	2993	98 52 55	3011	97 22 56	3029
27	Fomalhaut W.	92 34 46	3213	94 0 40	3229	95 26 15	3247	96 51 29	3264
	α Pegasi W.	72 44 5	2907	74 16 15	2920	75 48 8	2933	77 19 45	2946
	Pollux E.	47 26 30	2855	45 53 14	2876	44 20 24	2896	42 48 0	2918
	SUN E.	89 58 30	3116	88 30 40	3133	87 3 10	3148	85 35 59	3164
28	Fomalhaut W.	103 52 26	3396	105 15 33	3376	106 38 17	3395	108 0 39	3415
	α Pegasi W.	84 53 55	3007	86 23 59	3018	87 53 49	3030	89 23 24	3042
	α Arietis W.	41 30 16	2922	43 2 7	2931	44 33 47	2940	46 5 15	2950
	Pollux E.	35 12 58	3032	33 43 25	3059	32 14 25	3087	30 45 59	3117
	SUN E.	78 24 39	3237	76 59 14	3252	75 34 6	3265	74 9 13	3277
29	α Pegasi W.	96 47 55	3096	98 16 10	3106	99 44 12	3116	101 12 2	3125
	α Arietis W.	53 39 47	2992	55 10 10	3000	56 40 23	3007	58 10 27	3014
	SUN E.	67 8 22	3335	65 44 51	3345	64 21 32	3356	62 58 25	3365
30	α Pegasi W.	108 28 19	3173	109 55 0	3182	111 21 31	3191	112 47 51	3200
	α Arietis W.	65 38 38	3047	67 7 53	3052	68 37 2	3057	70 6 4	3062
	Aldebaran W.	33 4 43	3127	34 32 20	3124	36 0 0	3124	37 27 41	3123
	SUN E.	56 5 23	3408	54 43 15	3415	53 21 16	3423	51 59 25	3430
31	α Arietis W.	77 29 52	3082	78 58 23	3085	80 26 51	3087	81 55 16	3091
	Aldebaran W.	44 46 14	3122	46 13 57	3123	47 41 39	3122	49 9 22	3123
	SUN E.	45 11 59	3460	43 50 50	3464	42 29 46	3470	41 8 48	3474

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Frid.	1	10 41 38.66	9.072	N. 8 16 31.1	-54.47	15 53.60	64.42	0 5.06	0.782
Sat.	2	10 45 16.25	9.060	7 54 39.8	54.80	15 53.83	64.38	0 23.97	0.793
SUN.	3	10 48 53.58	9.050	7 32 40.8	55.12	15 54.06	64.34	0 43.14	0.804
Mon.	4	10 52 30.65	9.040	7 10 34.4	-55.42	15 54.29	64.30	1 2.57	0.814
Tues.	5	10 56 7.48	9.030	6 48 21.0	55.70	15 54.53	64.26	1 22.24	0.824
Wed.	6	10 59 44.08	9.021	6 26 1.0	55.97	15 54.77	64.23	1 42.14	0.833
Thur.	7	11 3 20.47	9.012	6 3 34.7	-56.23	15 55.02	64.20	2 2.25	0.842
Frid.	8	11 6 56.66	9.004	5 41 2.3	56.47	15 55.27	64.17	2 22.56	0.850
Sat.	9	11 10 32.67	8.997	5 18 24.4	56.69	15 55.52	64.15	2 43.04	0.857
SUN.	10	11 14 8.51	8.991	4 55 41.1	-56.90	15 55.77	64.13	3 3.70	0.864
Mon.	11	11 17 44.20	8.985	4 32 53.0	57.11	15 56.03	64.11	3 24.50	0.870
Tues.	12	11 21 19.77	8.980	4 10 0.2	57.29	15 56.29	64.09	3 45.43	0.875
Wed.	13	11 24 55.22	8.975	3 47 3.2	-57.46	15 56.56	64.08	4 6.48	0.879
Thur.	14	11 28 30.58	8.971	3 24 2.1	57.62	15 56.82	64.07	4 27.61	0.883
Frid.	15	11 32 5.86	8.969	3 0 57.4	57.77	15 57.08	64.06	4 48.82	0.885
Sat.	16	11 35 41.10	8.968	2 37 49.4	-57.90	15 57.35	64.06	5 10.08	0.886
SUN.	17	11 39 16.30	8.967	2 14 38.4	58.02	15 57.62	64.06	5 31.37	0.887
Mon.	18	11 42 51.51	8.967	1 51 24.6	58.13	15 57.88	64.06	5 52.66	0.887
Tues.	19	11 46 26.73	8.968	1 28 8.5	-58.22	15 58.15	64.07	6 13.94	0.886
Wed.	20	11 50 1.99	8.970	1 4 50.2	58.30	15 58.41	64.08	6 35.17	0.884
Thur.	21	11 53 37.32	8.974	0 41 30.2	58.37	15 58.68	64.09	6 56.34	0.880
Frid.	22	11 57 12.74	8.979	N. 0 18 8.7	-58.42	15 58.95	64.11	7 17.41	0.875
Sat.	23	12 0 48.27	8.984	S. 0 5 13.9	58.46	15 59.22	64.13	7 38.37	0.870
SUN.	24	12 4 23.95	8.990	0 28 37.4	58.49	15 59.48	64.15	7 59.19	0.864
Mon.	25	12 7 59.78	8.997	0 52 1.3	-58.50	15 59.75	64.17	8 19.85	0.857
Tues.	26	12 11 35.80	9.005	1 15 25.3	58.50	16 0.01	64.20	8 40.33	0.849
Wed.	27	12 15 12.02	9.014	1 38 49.2	58.49	16 0.28	64.23	9 0.60	0.840
Thur.	28	12 18 48.48	9.024	2 2 12.5	-58.46	16 0.55	64.26	9 20.65	0.830
Frid.	29	12 22 25.18	9.035	2 25 34.9	58.41	16 0.82	64.29	9 40.45	0.820
Sat.	30	12 26 2.14	9.046	2 48 56.1	58.35	16 1.09	64.33	9 59.98	0.809
SUN.	31	12 29 39.39	9.058	S. 3 12 15.5	-58.27	16 1.37	64.37	10 19.23	0.796

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.13 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations increasing.

AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Frid.	1	10 41 38.67	9.075	N. 8 16 31.0	-54.48	0 5.06	0.782	10 41 43.73
Sat.	2	10 45 16.31	9.063	7 54 39.4	54.81	0 23.97	0.793	10 45 40.29
SUN.	3	10 48 53.69	9.052	7 32 40.1	55.13	0 43.15	0.804	10 49 36.84
Mon.	4	10 52 30.81	9.042	7 10 33.4	-55.43	1 2.58	0.815	10 53 33.39
Tues.	5	10 56 7.68	9.032	6 48 19.7	55.71	1 22.26	0.825	10 57 29.94
Wed.	6	10 59 44.33	9.023	6 25 59.4	55.98	1 42.16	0.834	11 1 26.50
Thur.	7	11 3 20.77	9.014	6 3 32.7	-56.24	2 2.28	0.842	11 5 23.05
Frid.	8	11 6 57.01	9.006	5 41 0.0	56.48	2 22.59	0.850	11 9 19.60
Sat.	9	11 10 33.07	8.999	5 18 21.7	56.70	2 43.08	0.857	11 13 16.16
SUN.	10	11 14 8.97	8.993	4 55 38.2	-56.91	3 3.74	0.864	11 17 12.71
Mon.	11	11 17 44.71	8.987	4 32 49.7	57.12	3 24.55	0.870	11 21 9.26
Tues.	12	11 21 20.33	8.982	4 9 56.6	57.30	3 45.49	0.875	11 25 5.82
Wed.	13	11 24 55.83	8.977	3 46 59.2	-57.47	4 6.54	0.879	11 29 2.37
Thur.	14	11 28 31.24	8.973	3 23 57.8	57.63	4 27.68	0.882	11 32 58.92
Frid.	15	11 32 6.58	8.971	3 0 52.7	57.78	4 48.89	0.885	11 36 55.48
Sat.	16	11 35 41.87	8.970	2 37 44.4	-57.91	5 10.16	0.887	11 40 52.03
SUN.	17	11 39 17.13	8.969	2 14 33.0	58.03	5 31.45	0.887	11 44 48.58
Mon.	18	11 42 52.38	8.970	1 51 18.9	58.14	5 52.75	0.887	11 48 45.13
Tues.	19	11 46 27.66	8.971	1 28 2.4	-58.23	6 14.03	0.886	11 52 41.69
Wed.	20	11 50 2.97	8.973	1 4 43.8	58.31	6 35.26	0.884	11 56 38.24
Thur.	21	11 53 38.35	8.976	0 41 23.4	58.38	6 56.44	0.880	12 0 34.79
Frid.	22	11 57 13.83	8.981	N. 0 18 1.6	-58.43	7 17.51	0.876	12 4 31.34
Sat.	23	12 0 49.42	8.986	S. 0 5 21.4	58.47	7 38.48	0.871	12 8 27.90
SUN.	24	12 4 25.15	8.992	0 28 45.2	58.50	7 59.30	0.864	12 12 24.45
Mon.	25	12 8 1.03	8.999	0 52 9.4	-58.51	8 19.97	0.857	12 16 21.00
Tues.	26	12 11 37.10	9.007	1 15 33.8	58.51	8 40.45	0.849	12 20 17.55
Wed.	27	12 15 13.38	9.016	1 38 58.0	58.50	9 0.73	0.840	12 24 14.11
Thur.	28	12 18 49.88	9.026	2 2 21.6	-58.47	9 20.78	0.830	12 28 10.66
Frid.	29	12 22 26.63	9.037	2 25 44.4	58.42	9 40.58	0.820	12 32 7.21
Sat.	30	12 26 3.65	9.049	2 49 5.8	58.36	10 0.12	0.808	12 36 3.76
SUN.	31	12 29 40.95	9.061	S. 3 12 25.6	-58.28	10 19.37	0.796	12 40 0.32
NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.								Diff. for 1 Hour, + 9°.8565. (Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.	
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	244	158 48 14.3	47 22.6	145.30	— 0.50	0.0038107	—42.9	h m s	
2	245	159 46 22.4	45 30.6	145.37	0.60	0.0037069	43.6	13 16 5.49	
3	246	160 44 32.3	43 40.4	145.45	0.68	0.0036017	44.2	13 12 9.58	
4	247	161 42 44.1	41 52.1	145.53	— 0.75	0.0034946	—44.9	13 8 13.68	
5	248	162 40 57.7	40 5.6	145.60	0.78	0.0033859	45.6	13 4 17.77	
6	249	163 39 13.0	38 20.8	145.67	0.77	0.0032756	46.3	13 0 21.86	
7	250	164 37 30.0	36 37.7	145.74	— 0.74	0.0031637	—47.0	12 56 25.95	
8	251	165 35 48.7	34 56.3	145.81	0.68	0.0030502	47.6	12 52 30.05	
9	252	166 34 9.0	33 16.5	145.88	0.60	0.0029354	48.1	12 48 34.14	
10	253	167 32 30.9	31 38.3	145.95	— 0.49	0.0028194	—48.6	12 44 38.23	
11	254	168 30 54.3	30 1.6	146.01	0.37	0.0027022	49.0	12 40 42.32	
12	255	169 29 19.4	28 26.6	146.08	0.24	0.0025839	49.4	12 36 46.42	
13	256	170 27 46.0	26 53.1	146.14	— 0.10	0.0024648	—49.7	12 32 50.51	
14	257	171 26 14.2	25 21.2	146.21	+ 0.03	0.0023453	49.9	12 28 54.60	
15	258	172 24 44.1	23 51.0	146.28	0.15	0.0022251	50.1	12 24 58.70	
16	259	173 23 15.6	22 22.4	146.35	— 0.10	0.0021046	—50.3	12 21 2.79	
17	260	174 21 48.8	20 55.5	146.42	+ 0.24	0.0019838	50.3	12 17 6.88	
18	261	175 20 23.9	19 30.5	146.50	0.32	0.0018629	50.4	12 13 10.98	
19	262	176 19 0.8	18 7.3	146.58	— 0.37	0.0017422	—50.4	12 9 15.07	
20	263	177 17 39.6	16 46.0	146.66	+ 0.39	0.0016213	50.3	12 5 19.16	
21	264	178 16 20.4	15 26.7	146.74	0.37	0.0015006	50.3	12 1 23.26	
22	265	179 15 3.3	14 9.5	146.83	— 0.33	0.0013798	—50.3	11 57 27.35	
23	266	180 13 48.3	12 54.4	146.92	+ 0.26	0.0012591	50.3	11 53 31.44	
24	267	181 12 35.6	11 41.6	147.01	0.16	0.0011383	50.3	11 49 35.54	
25	268	182 11 25.0	10 30.9	147.11	+ 0.05	0.0010176	50.3	11 45 39.63	
26	269	183 10 16.8	9 22.6	147.20	— 0.07	0.0008967	—50.3	11 41 43.72	
27	270	184 9 10.9	8 16.6	147.30	0.20	0.0007755	50.4	11 37 47.82	
28	271	185 8 7.2	7 12.8	147.40	— 0.33	0.0006540	—50.6	11 33 51.91	
29	272	186 7 5.9	6 11.5	147.49	— 0.45	0.0005321	—50.7	11 29 56.00	
30	273	187 6 6.9	5 12.4	147.59	0.56	0.0004096	50.9	11 26 0.10	
31	274	188 5 10.0	4 15.4	147.68	— 0.64	0.0002867	51.1	11 22 4.19	
					— 0.71	0.0002867	—51.4	11 18 8.28	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0. <sup>th</sup> .								Diff. for 1 Hour, —0 <sup>h</sup> .8296. (Table II.)	

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	14 46.1	14 44.9	54 5.4	-0.44	54 1.0	-0.29	22 0.3	1.81	26.0	
2	14 44.2	14 44.0	53 58.4	-0.15	53 57.4	-0.02	22 43.0	1.75	27.0	
3	14 44.1	14 44.7	53 58.0	+0.11	54 0.0	+0.23	23 24.5	1.71	28.0	
4	14 45.6	14 46.9	54 3.4	+0.34	54 8.1	+0.44	6		29.0	
5	14 48.5	14 50.4	54 14.0	0.55	54 21.1	0.64	0 5.5	1.71	0.4	
6	14 52.7	14 55.3	54 29.4	0.74	54 38.9	0.84	0 46.8	1.74	1.4	
7	14 58.2	15 1.4	54 49.6	+0.94	55 1.5	+1.04	1 29.2	1.80	2.4	
8	15 5.0	15 8.9	55 14.6	1.14	55 28.9	1.25	2 13.5	1.89	3.4	
9	15 13.1	15 17.7	55 44.5	1.35	56 1.4	1.46	3 0.3	2.01	4.4	
10	15 22.7	15 28.0	56 19.6	+1.57	56 39.0	+1.67	3 50.3	2.15	5.4	
11	15 33.6	15 39.5	56 59.6	1.76	57 21.2	1.84	4 43.5	2.28	6.4	
12	15 45.6	15 51.9	57 43.7	1.90	58 6.9	1.94	5 39.5	2.38	7.4	
13	15 58.3	16 4.7	58 30.3	+1.96	58 53.8	+1.94	6 37.4	2.43	8.4	
14	16 10.9	16 16.9	59 16.8	1.88	59 38.9	1.78	7 35.7	2.42	9.4	
15	16 22.5	16 27.6	59 59.4	1.63	60 17.9	1.43	8 33.3	2.37	10.4	
16	16 31.9	16 35.3	60 33.7	+1.18	60 46.2	+0.89	9 29.4	2.31	11.4	
17	16 37.7	16 39.0	60 55.1	+0.56	60 59.8	+0.21	10 24.1	2.25	12.4	
18	16 39.1	16 37.9	61 0.1	-0.16	60 55.9	-0.54	11 17.6	2.22	13.4	
19	16 35.5	16 32.0	60 47.2	-0.90	60 34.2	-1.25	12 10.7	2.21	14.4	
20	16 27.4	16 21.8	60 17.3	1.55	59 56.9	1.82	13 4.0	2.23	15.4	
21	16 15.5	16 8.6	59 33.7	2.03	59 8.2	2.19	13 58.0	2.26	16.4	
22	16 1.2	15 53.6	58 41.2	-2.29	58 13.2	-2.34	14 52.6	2.28	17.4	
23	15 45.9	15 38.3	57 45.0	2.34	57 17.1	2.29	15 47.3	2.26	18.4	
24	15 31.0	15 24.0	56 50.1	2.20	56 24.3	2.08	16 41.5	2.23	19.4	
25	15 17.4	15 11.3	56 0.2	-1.93	55 37.9	-1.76	17 34.0	2.15	20.4	
26	15 5.9	15 1.0	55 17.9	1.58	55 0.1	1.38	18 24.3	2.04	21.4	
27	14 56.9	14 53.4	54 44.8	1.17	54 32.0	0.97	19 12.0	1.94	22.4	
28	14 50.6	14 48.4	54 21.6	-0.76	54 13.7	-0.56	19 57.3	1.84	23.4	
29	14 46.9	14 46.0	54 8.1	-0.37	54 4.9	-0.18	20 40.5	1.77	24.4	
30	14 45.7	14 46.0	54 3.8	0.00	54 4.8	+0.16	21 22.4	1.73	25.4	
31	14 46.8	14 48.0	54 7.7	+0.31	54 12.3	+0.45	22 3.7	1.72	26.4	



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 1.					SUNDAY 3.				
0	h m s	"	N. 17 43 14.9	8.155	0	h m s	"	N. 10 0 14.5	10.867
1	8 2 33.08	1.9923	17 35 3.4	8.227	1	9 34 45.66	1.8622	9 49 21.3	10.907
2	8 4 32.52	1.9889	17 26 47.6	8.299	2	9 36 37.34	1.8604	9 38 25.7	10.946
3	8 6 31.75	1.9855	17 18 27.5	8.371	3	9 38 28.91	1.8587	9 27 27.8	10.983
4	8 8 30.78	1.9822	17 10 3.1	8.442	4	9 40 20.38	1.8569	9 16 27.7	11.021
5	8 10 29.61	1.9789	17 1 34.4	8.513	5	9 42 11.74	1.8552	9 5 25.3	11.057
6	8 12 28.25	1.9757	16 53 1.5	8.582	6	9 44 3.00	1.8535	8 54 20.8	11.093
7	8 14 26.69	1.9723	16 44 24.5	8.651	7	9 45 54.16	1.8519	8 43 14.1	11.128
8	8 16 24.93	1.9691	16 35 43.4	8.719	8	9 47 45.23	1.8503	8 32 5.4	11.166
9	8 18 22.98	1.9659	16 26 58.2	8.787	9	9 49 36.20	1.8488	8 20 54.6	11.197
10	8 20 20.84	1.9627	16 18 9.0	8.853	10	9 51 27.09	1.8474	8 9 41.7	11.231
11	8 22 18.50	1.9594	16 9 15.8	8.920	11	9 53 17.89	1.8460	7 58 26.9	11.263
12	8 24 15.97	1.9562	16 0 18.6	8.985	12	9 55 8.61	1.8446	7 47 10.2	11.294
13	8 26 13.25	1.9532	15 51 17.6	9.049	13	9 56 59.24	1.8432	7 35 51.6	11.326
14	8 28 10.35	1.9501	15 42 12.7	9.113	14	9 58 49.79	1.8419	7 24 31.1	11.357
15	8 30 7.26	1.9470	15 33 4.0	9.177	15	10 0 40.27	1.8407	7 13 8.8	11.386
16	8 32 3.99	1.9440	15 23 51.5	9.239	16	10 2 30.68	1.8395	7 1 44.8	11.415
17	8 34 0.54	1.9410	15 14 35.3	9.301	17	10 4 21.01	1.8383	6 50 19.0	11.443
18	8 35 56.91	1.9380	15 5 15.4	9.362	18	10 6 11.27	1.8372	6 38 51.6	11.471
19	8 37 53.10	1.9350	14 55 51.8	9.422	19	10 8 1.47	1.8362	6 27 22.5	11.498
20	8 39 49.11	1.9321	14 46 24.7	9.482	20	10 9 51.61	1.8351	6 15 51.8	11.524
21	8 41 44.95	1.9292	14 36 54.0	9.541	21	10 11 41.68	1.8341	6 4 19.6	11.549
22	8 43 40.61	1.9263	14 27 19.8	9.599	22	10 13 31.70	1.8332	5 52 45.9	11.574
23	8 45 36.11	1.9235	N. 14 17 42.1	9.657	23	10 15 21.67	1.8323	N. 5 41 10.7	11.598
24	8 47 31.43	1.9206				10 17 11.58	1.8314		
SATURDAY 2.					MONDAY 4.				
0	h m s	"	N. 14 8 1.0	9.713	0	h m s	"	N. 5 29 34.1	11.622
1	8 49 26.58	1.9178	13 58 16.5	9.769	1	10 19 1.44	1.8307	5 17 56.1	11.645
2	8 51 21.57	1.9152	13 48 28.7	9.824	2	10 20 51.26	1.8300	5 6 16.7	11.667
3	8 53 16.40	1.9125	13 38 37.6	9.879	3	10 22 41.04	1.8292	4 54 36.0	11.688
4	8 55 11.07	1.9098	13 28 43.2	9.934	4	10 24 30.77	1.8286	4 42 54.1	11.709
5	8 57 5.57	1.9071	13 18 45.5	9.987	5	10 26 40.47	1.8281	4 31 10.9	11.729
6	8 58 59.92	1.9046	13 8 44.7	10.039	6	10 28 10.14	1.8275	4 19 26.6	11.748
7	9 0 54.12	1.9020	12 58 40.8	10.091	7	10 29 59.77	1.8270	4 7 41.1	11.767
8	9 2 48.16	1.8994	12 48 33.8	10.142	8	10 31 49.38	1.8266	3 55 54.5	11.785
9	9 4 42.05	1.8969	12 38 23.7	10.193	9	10 33 38.96	1.8262	3 44 6.9	11.803
10	9 6 35.79	1.8945	12 28 10.6	10.243	10	10 35 28.52	1.8258	3 32 18.2	11.820
11	9 8 29.39	1.8921	12 17 54.5	10.292	11	10 37 18.06	1.8256	3 20 28.5	11.835
12	9 10 22.84	1.8897	12 7 35.6	10.340	12	10 39 7.59	1.8253	3 8 38.0	11.849
13	9 12 16.15	1.8873	11 57 13.7	10.388	13	10 40 57.10	1.8251	2 56 46.6	11.864
14	9 14 9.32	1.8851	11 46 49.0	10.435	14	10 42 46.60	1.8249	2 44 54.3	11.878
15	9 16 2.36	1.8828	11 36 21.5	10.482	15	10 44 36.09	1.8248	2 33 1.2	11.892
16	9 17 55.26	1.8805	11 25 51.2	10.527	16	10 46 25.58	1.8248	2 21 7.3	11.904
17	9 19 48.02	1.8783	11 15 18.2	10.572	17	10 48 15.07	1.8248	2 9 12.7	11.916
18	9 21 40.66	1.8762	11 4 42.5	10.617	18	10 50 4.56	1.8248	1 57 17.4	11.927
19	9 23 33.17	1.8741	10 54 4.2	10.660	19	10 51 54.05	1.8249	1 45 21.5	11.937
20	9 25 25.55	1.8720	10 43 23.3	10.703	20	10 53 43.55	1.8251	1 33 25.0	11.947
21	9 27 17.81	1.8700	10 32 39.8	10.746	21	10 55 33.06	1.8253	1 21 27.9	11.955
22	9 29 9.95	1.8680	10 21 53.8	10.787	22	10 57 22.59	1.8256	1 9 30.4	11.963
23	9 31 1.97	1.8660	10 11 5.3	10.827	23	10 59 12.13	1.8258	0 57 32.3	11.971
24	9 32 53.87	1.8641	N. 10 0 14.5	10.867	24	11 1 1.69	1.8262		
	9 34 45.66	1.8622				11 2 51.28	1.8267		

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 5.					THURSDAY 7.				
0	11 2 51.28	1.8267	N. 0 45 33.9	11.977	0	12 31 59.12	1.9078	S. 8 43 8.6	11.487
1	11 4 40.89	1.8271	0 33 35.1	11.983	1	12 33 53.64	1.9101	8 54 33.3	11.396
2	11 6 30.53	1.8276	0 21 35.9	11.989	2	12 35 48.33	1.9130	9 5 56.1	11.364
3	11 8 20.20	1.8282	N. 0 9 36.4	11.993	3	12 37 43.20	1.9161	9 17 17.0	11.332
4	11 10 9.91	1.8287	S. 0 2 23.3	11.997	4	12 39 38.26	1.9192	9 28 35.9	11.298
5	11 11 59.65	1.8294	0 14 23.2	12.000	5	12 41 33.51	1.9223	9 39 52.8	11.264
6	11 13 49.44	1.8302	0 26 23.3	12.003	6	12 43 28.94	1.9255	9 51 7.6	11.229
7	11 15 39.27	1.8309	0 38 23.6	12.005	7	12 45 24.57	1.9287	10 2 20.3	11.193
8	11 17 29.15	1.8317	0 50 23.9	12.005	8	12 47 20.39	1.9320	10 13 30.8	11.157
9	11 19 19.08	1.8326	1 2 24.2	12.005	9	12 49 16.41	1.9353	10 24 39.1	11.119
10	11 21 9.06	1.8335	1 14 24.5	12.005	10	12 51 12.63	1.9387	10 35 45.1	11.081
11	11 22 59.10	1.8345	1 26 24.8	12.004	11	12 53 9.06	1.9422	10 46 48.8	11.042
12	11 24 49.20	1.8355	1 38 25.0	12.002	12	12 55 5.70	1.9457	10 57 50.1	11.002
13	11 26 39.36	1.8366	1 50 25.1	11.999	13	12 57 2.54	1.9492	11 8 49.0	10.961
14	11 28 29.59	1.8377	2 2 24.9	11.996	14	12 58 59.60	1.9527	11 19 45.4	10.918
15	11 30 19.89	1.8389	2 14 24.6	11.992	15	13 0 56.87	1.9563	11 30 39.2	10.876
16	11 32 10.26	1.8402	2 26 24.0	11.987	16	13 2 54.36	1.9600	11 41 30.5	10.832
17	11 34 0.71	1.8415	2 38 23.0	11.981	17	13 4 52.07	1.9637	11 52 19.1	10.788
18	11 35 51.24	1.8428	2 50 21.7	11.975	18	13 6 50.00	1.9674	12 3 5.1	10.743
19	11 37 41.85	1.8442	3 2 20.0	11.968	19	13 8 48.16	1.9712	12 13 48.3	10.697
20	11 39 32.54	1.8456	3 14 17.9	11.960	20	13 10 46.55	1.9751	12 24 28.7	10.649
21	11 41 23.32	1.8471	3 26 15.2	11.951	21	13 12 45.17	1.9790	12 35 6.2	10.601
22	11 43 14.19	1.8487	3 38 12.0	11.942	22	13 14 44.03	1.9829	12 45 40.8	10.552
23	11 45 5.16	1.8502	S. 3 50 8.2	11.932	23	13 16 43.12	1.9869	S. 12 56 12.4	10.502
WEDNESDAY 6.					FRIDAY 8.				
0	11 46 56.22	1.8519	S. 4 2 3.8	11.921	0	13 18 42.46	1.9910	S. 13 6 41.0	10.452
1	11 48 47.39	1.8537	4 13 58.7	11.909	1	13 20 42.04	1.9950	13 17 6.6	10.400
2	11 50 38.66	1.8553	4 25 52.9	11.897	2	13 22 41.86	1.9991	13 27 29.0	10.347
3	11 52 30.03	1.8571	4 37 46.3	11.883	3	13 24 41.93	1.0032	13 37 48.2	10.293
4	11 54 21.51	1.8590	4 49 38.9	11.869	4	13 26 42.25	1.0074	13 48 4.2	10.239
5	11 56 13.11	1.8610	5 1 30.6	11.855	5	13 28 42.82	1.0116	13 58 16.9	10.183
6	11 58 4.83	1.8629	5 13 21.5	11.840	6	13 30 43.64	1.0158	14 8 26.2	10.127
7	11 59 56.66	1.8649	5 25 11.4	11.823	7	13 32 44.72	1.0202	14 18 32.1	10.070
8	12 1 48.62	1.8670	5 37 0.3	11.806	8	13 34 46.06	1.0245	14 28 34.6	10.012
9	12 3 40.70	1.8691	5 48 48.1	11.788	9	13 36 47.66	1.0289	14 38 33.5	9.952
10	12 5 32.91	1.8712	6 0 34.9	11.770	10	13 38 49.53	1.0334	14 48 28.8	9.892
11	12 7 25.25	1.8735	6 12 20.5	11.751	11	13 40 51.67	1.0378	14 58 20.5	9.831
12	12 9 17.73	1.8758	6 24 5.0	11.731	12	13 42 54.07	1.0422	15 8 8.5	9.768
13	12 11 10.35	1.8782	6 35 48.2	11.710	13	13 44 56.74	1.0468	15 17 52.7	9.705
14	12 13 3.11	1.8805	6 47 30.2	11.688	14	13 46 59.69	1.0514	15 27 33.1	9.642
15	12 14 56.01	1.8829	6 59 10.8	11.666	15	13 49 2.91	1.0560	15 37 9.7	9.577
16	12 16 49.06	1.8854	7 10 50.1	11.642	16	13 51 6.41	1.0606	15 46 42.4	9.511
17	12 18 42.26	1.8879	7 22 27.9	11.617	17	13 53 10.18	1.0652	15 56 11.0	9.443
18	12 20 35.61	1.8905	7 34 4.2	11.592	18	13 55 14.24	1.0700	16 5 35.6	9.375
19	12 22 29.12	1.8932	7 45 39.0	11.567	19	13 57 18.58	1.0747	16 14 56.0	9.306
20	12 24 22.79	1.8958	7 57 12.3	11.541	20	13 59 23.20	1.0794	16 24 12.3	9.237
21	12 26 16.62	1.8986	8 8 43.9	11.513	21	14 1 28.11	1.0842	16 33 24.4	9.166
22	12 28 10.62	1.9013	8 20 13.9	11.485	22	14 3 33.30	1.0890	16 42 32.2	9.094
23	12 30 4.78	1.9042	8 31 42.1	11.456	23	14 5 38.79	1.0938	16 51 35.7	9.021
24	12 31 59.12	1.9072	S. 8 43 8.6	11.427	24	14 7 44.56	1.0987	S. 17 0 34.7	8.947

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 9.					MONDAY 11.				
0	14 7 44.56	2.0987	S. 17 0 34.7	8.947	0	15 54 19.22	2.3406	S. 22 25 35.9	4.887
1	14 9 50.63	2.1037	17 9 29.3	8.878	1	15 56 39.80	2.3432	22 29 44.7	4.085
2	14 11 57.00	2.1086	17 18 19.3	8.796	2	15 59 0.65	2.3498	22 33 46.1	3.961
3	14 14 3.66	2.1134	17 27 4.8	8.719	3	16 1 21.78	2.3544	22 37 40.0	3.836
4	14 16 10.61	2.1184	17 35 45.6	8.641	4	16 3 43.18	2.3589	22 41 26.4	3.711
5	14 18 17.87	2.1233	17 44 21.7	8.562	5	16 6 4.85	2.3634	22 45 5.3	3.584
6	14 20 25.43	2.1284	17 52 53.1	8.482	6	16 8 26.79	2.3678	22 48 36.5	3.457
7	14 22 33 2	2.1334	18 1 19.6	8.401	7	16 10 48.99	2.3722	22 52 0.1	3.339
8	14 24 41.44	2.1385	18 9 41.2	8.319	8	16 13 11.45	2.3765	22 55 16.0	3.200
9	14 26 49.90	2.1436	18 17 57.9	8.237	9	16 15 34.17	2.3808	22 58 24.1	3.070
10	14 28 58.67	2.1487	18 26 9.6	8.153	10	16 17 57.15	2.3850	23 1 24.4	2.940
11	14 31 7.74	2.1537	18 34 16.2	8.068	11	16 20 20.37	2.3892	23 4 16.9	2.808
12	14 33 17.11	2.1587	18 42 17.7	7.982	12	16 22 43.85	2.3933	23 7 1.4	2.676
13	14 35 26.79	2.1639	18 50 14.0	7.894	13	16 25 7.57	2.3973	23 9 38.0	2.542
14	14 37 36.78	2.1691	18 58 5.0	7.806	14	16 27 31.53	2.4023	23 12 6.5	2.408
15	14 39 47.08	2.1742	19 5 50.7	7.717	15	16 29 55.73	2.4058	23 14 27.0	2.274
16	14 41 57.69	2.1793	19 13 31.1	7.627	16	16 32 20.16	2.4092	23 16 39.4	2.139
17	14 44 8.60	2.1845	19 21 6.0	7.536	17	16 34 44.83	2.4130	23 18 43.7	2.003
18	14 46 19.83	2.1897	19 28 35.4	7.443	18	16 37 9.72	2.4167	23 20 39.8	1.866
19	14 48 31.36	2.1948	19 35 59.2	7.350	19	16 39 34.83	2.4203	23 22 27.6	1.728
20	14 50 43.20	2.2000	19 43 17.4	7.256	20	16 42 0.16	2.4239	23 24 7.2	1.592
21	14 52 55.36	2.2052	19 50 29.9	7.161	21	16 44 25.70	2.4275	23 25 38.5	1.452
22	14 55 7.82	2.2108	19 57 36.7	7.065	22	16 46 51.46	2.4310	23 27 1.4	1.312
23	14 57 20.59	2.2154	S. 20 4 37.7	6.967	23	16 49 17.42	2.4343	S. 23 28 15.9	1.171
SUNDAY 10.					TUESDAY 12.				
0	14 59 33.67	2.2207	S. 20 11 32.8	6.869	0	16 51 43.58	2.4377	S. 23 29 21.9	1.030
1	15 1 47.07	2.2258	20 18 22.0	6.769	1	16 54 9.94	2.4409	23 30 19.5	0.889
2	15 4 0.77	2.2308	20 25 5.1	6.668	2	16 56 36.49	2.4441	23 31 8.6	0.747
3	15 6 14.79	2.2358	20 31 42.2	6.567	3	16 59 3.23	2.4472	23 31 49.2	0.605
4	15 8 29.12	2.2413	20 38 13.2	6.465	4	17 1 30.16	2.4502	23 32 21.2	0.462
5	15 10 43.75	2.2464	20 44 38.0	6.362	5	17 3 57.26	2.4532	23 32 44.6	0.318
6	15 12 58.69	2.2516	20 50 56.6	6.257	6	17 6 24.54	2.4561	23 32 59.4	0.174
7	15 15 13.94	2.2567	20 57 8.9	6.152	7	17 8 51.99	2.4588	23 33 5.5	- 0.089
8	15 17 29.50	2.2618	21 3 14.8	6.045	8	17 11 19.60	2.4615	23 33 2.9	+ 0.116
9	15 19 45.36	2.2669	21 9 14.3	5.937	9	17 13 47.37	2.4642	23 32 51.6	0.261
10	15 22 1.53	2.2720	21 15 7.3	5.828	10	17 16 15.30	2.4667	23 32 31.6	0.407
11	15 24 18.00	2.2771	21 20 53.7	5.719	11	17 18 43.37	2.4691	23 32 2.7	0.554
12	15 26 34.78	2.2822	21 26 33.6	5.609	12	17 21 11.59	2.4715	23 31 25.1	0.701
13	15 28 51.86	2.2872	21 32 6.8	5.497	13	17 23 39.95	2.4737	23 30 38.6	0.848
14	15 31 9.24	2.2922	21 37 33.3	5.385	14	17 26 8.44	2.4760	23 29 43.3	0.995
15	15 33 26.92	2.2972	21 42 53.0	5.272	15	17 28 37.07	2.4782	23 28 39.2	1.143
16	15 35 44.90	2.3021	21 48 5.9	5.157	16	17 31 5.82	2.4802	23 27 26.1	1.292
17	15 38 3.17	2.3070	21 53 11.9	5.042	17	17 33 34.69	2.4821	23 26 4.2	1.440
18	15 40 21.74	2.3119	21 58 10.9	4.925	18	17 36 3.67	2.4839	23 24 33.3	1.589
19	15 42 40.60	2.3167	22 3 2.9	4.808	19	17 38 32.76	2.4857	23 22 53.5	1.738
20	15 44 59.75	2.3216	22 7 47.9	4.690	20	17 41 1.95	2.4873	23 21 4.7	1.887
21	15 47 19.19	2.3264	22 12 25.7	4.571	21	17 43 31.24	2.4890	23 19 7.0	2.037
22	15 49 38.92	2.3312	22 16 56.4	4.451	22	17 46 0.63	2.4906	23 17 0.2	2.187
23	15 51 58.93	2.3358	22 21 19.8	4.329	23	17 48 30.11	2.4920	23 14 44.5	2.337
24	15 54 19.22	2.3406	S. 22 25 35.9	4.207	24	17 50 59.67	2.4933	S. 23 12 19.8	2.489

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 13.					FRIDAY 15.				
0	17 50 59.67	2.4933	S. 23 12 19.8	2.487	0	19 50 38.52	2.4647	S. 18 23 12.5	9.381
1	17 53 29.31	2.4946	23 9 46.1	2.637	1	19 53 6.34	2.4626	18 13 45.8	9.508
2	17 55 59.02	2.4957	23 7 3.4	2.787	2	19 55 34.03	2.4604	18 4 11.5	9.634
3	17 58 28.79	2.4967	23 4 11.6	2.938	3	19 58 1.59	2.4582	17 54 29.7	9.759
4	18 0 58.62	2.4977	23 1 10.8	3.088	4	20 0 29.02	2.4561	17 44 40.4	9.884
5	18 3 28.51	2.4986	22 58 1.0	3.238	5	20 2 56.32	2.4538	17 34 43.6	10.007
6	18 5 58.45	2.4994	22 54 42.2	3.388	6	20 5 23.48	2.4516	17 24 39.5	10.128
7	18 8 28.44	2.5002	22 51 14.4	3.539	7	20 7 50.51	2.4493	17 14 28.2	10.249
8	18 10 58.47	2.5008	22 47 37.5	3.690	8	20 10 17.40	2.4470	17 4 9.6	10.370
9	18 13 28.54	2.5013	22 43 51.6	3.840	9	20 12 44.15	2.4447	16 53 43.8	10.488
10	18 15 58.63	2.5017	22 39 56.7	3.990	10	20 15 10.76	2.4423	16 43 11.0	10.605
11	18 18 28.75	2.5022	22 35 52.8	4.140	11	20 17 37.23	2.4400	16 32 31.2	10.722
12	18 20 58.89	2.5025	22 31 39.9	4.290	12	20 20 3.56	2.4376	16 21 44.4	10.837
13	18 23 29.05	2.5027	22 27 18.0	4.440	13	20 22 29.74	2.4352	16 10 50.8	10.950
14	18 25 59.21	2.5027	22 22 47.1	4.589	14	20 24 55.78	2.4327	15 59 50.4	11.062
15	18 28 29.38	2.5028	22 18 7.3	4.738	15	20 27 21.67	2.4303	15 48 43.4	11.172
16	18 30 59.55	2.5028	22 13 18.5	4.887	16	20 29 47.42	2.4279	15 37 29.7	11.282
17	18 33 29.72	2.5027	22 8 20.8	5.037	17	20 32 13.02	2.4254	15 26 9.5	11.391
18	18 35 59.87	2.5024	22 3 14.1	5.185	18	20 34 38.47	2.4229	15 14 42.8	11.498
19	18 38 30.01	2.5022	21 57 58.6	5.333	19	20 37 3.77	2.4204	15 3 9.7	11.604
20	18 41 0.13	2.5018	21 52 34.1	5.482	20	20 39 28.92	2.4180	14 51 30.3	11.708
21	18 43 30.23	2.5014	21 47 0.8	5.630	21	20 41 53.93	2.4155	14 39 44.7	11.811
22	18 46 0.30	2.5008	21 41 18.7	5.775	22	20 44 18.78	2.4129	14 27 53.0	11.912
23	18 48 30.33	2.5002	S. 21 35 27.8	5.922	23	20 46 43.48	2.4104	S. 14 15 55.2	12.012
THURSDAY 14.					SATURDAY 16.				
0	18 51 0.33	2.4996	S. 21 29 28.1	6.067	0	20 49 8.03	2.4079	S. 14 3 51.5	12.111
1	18 53 30.28	2.4988	21 23 19.7	6.213	1	20 51 32.43	2.4055	13 51 41.9	12.208
2	18 56 0.19	2.4981	21 17 2.5	6.359	2	20 53 56.69	2.4030	13 39 26.5	12.303
3	18 58 30.05	2.4972	21 10 36.6	6.504	3	20 55 20.79	2.4004	13 27 5.5	12.397
4	19 0 59.85	2.4962	21 4 2.0	6.648	4	20 58 44.74	2.3979	13 14 38.8	12.491
5	19 3 29.59	2.4952	20 57 18.8	6.792	5	21 1 8.54	2.3955	13 2 6.6	12.582
6	19 5 59.27	2.4941	20 50 27.0	6.934	6	21 3 32.20	2.3931	12 49 28.9	12.672
7	19 8 28.88	2.4929	20 43 26.7	7.077	7	21 5 55.71	2.3906	12 36 45.9	12.760
8	19 10 58.42	2.4917	20 36 17.8	7.219	8	21 8 19.07	2.3881	12 23 57.7	12.847
9	19 13 27.89	2.4904	20 29 0.4	7.360	9	21 10 42.28	2.3857	12 11 4.3	12.932
10	19 15 57.27	2.4890	20 21 34.6	7.500	10	21 13 5.35	2.3832	11 58 5.9	13.015
11	19 18 26.57	2.4877	20 14 0.4	7.640	11	21 15 28.27	2.3807	11 45 2.5	13.097
12	19 20 55.79	2.4862	20 6 17.8	7.779	12	21 17 51.04	2.3783	11 31 54.2	13.177
13	19 23 24.92	2.4847	19 58 26.9	7.917	13	21 20 13.67	2.3761	11 18 41.2	13.256
14	19 25 53.96	2.4832	19 50 27.8	8.054	14	21 22 36.17	2.3737	11 5 23.5	13.333
15	19 28 22.90	2.4815	19 42 20.4	8.192	15	21 24 58.52	2.3713	10 52 1.2	13.409
16	19 30 51.74	2.4798	19 34 4.8	8.327	16	21 27 20.73	2.3692	10 38 34.4	13.482
17	19 33 20.48	2.4781	19 25 41.1	8.462	17	21 29 42.81	2.3667	10 25 3.3	13.555
18	19 35 49.11	2.4762	19 17 9.4	8.596	18	21 32 4.74	2.3644	10 11 27.8	13.626
19	19 38 17.63	2.4744	19 8 29.6	8.729	19	21 34 26.54	2.3622	9 57 48.2	13.694
20	19 40 46.04	2.4726	18 59 41.9	8.861	20	21 36 48.21	2.3601	9 44 4.5	13.762
21	19 43 14.34	2.4707	18 50 46.3	8.992	21	21 39 9.75	2.3579	9 30 16.8	13.827
22	19 45 42.52	2.4687	18 41 42.8	9.123	22	21 41 31.16	2.3557	9 16 25.3	13.890
23	19 48 10.58	2.4667	18 32 31.5	9.252	23	21 43 52.43	2.3535	9 2 30.0	13.952
24	19 50 38.52	2.4647	S. 18 23 12.5	9.381	24	21 46 13.58	2.3514	S. 8 48 31.0	14.013

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 17.					TUESDAY 19.				
0	21 46 13.58	2.3514	S. 8 48 31.0	14.013	0	23 37 23.28	2.2967	N. 3 0 7.9	14.826
1	21 48 34.60	2.3493	8 34 28.4	14.072	1	23 39 41.08	2.2967	3 14 56.7	14.799
2	21 50 55.50	2.3473	8 20 22.4	14.128	2	23 41 58.88	2.2967	3 29 43.8	14.770
3	21 53 16.28	2.3453	8 6 13.0	14.184	3	23 44 16.68	2.2967	3 44 29.1	14.740
4	21 55 36.94	2.3433	7 52 0.3	14.237	4	23 46 34.48	2.2967	3 59 12.6	14.708
5	21 57 57.48	2.3413	7 37 44.5	14.289	5	23 48 52.28	2.2967	4 13 54.1	14.675
6	22 0 17.90	2.3394	7 23 25.6	14.340	6	23 51 10.09	2.2969	4 28 33.6	14.640
7	22 2 38.21	2.3376	7 9 3.7	14.388	7	23 53 27.91	2.2971	4 43 10.9	14.603
8	22 4 58.41	2.3357	6 54 39.0	14.434	8	23 55 45.74	2.2973	4 57 46.0	14.565
9	22 7 18.50	2.3339	6 40 11.6	14.479	9	23 58 3.58	2.2976	5 12 18.7	14.524
10	22 9 38.48	2.3322	6 25 41.5	14.522	10	0 0 21.45	2.2979	5 26 48.9	14.482
11	22 11 58.36	2.3305	6 11 8.9	14.563	11	0 2 39.33	2.2982	5 41 16.5	14.438
12	22 14 18.14	2.3288	5 56 33.9	14.602	12	0 4 57.23	2.2986	5 55 41.5	14.393
13	22 16 37.82	2.3272	5 41 56.6	14.640	13	0 7 15.16	2.2990	6 10 3.7	14.346
14	22 18 57.40	2.3255	5 27 17.1	14.677	14	0 9 33.11	2.2994	6 24 23.0	14.297
15	22 21 16.88	2.3239	5 12 35.4	14.711	15	0 11 51.09	2.2999	6 38 39.4	14.247
16	22 23 36.27	2.3224	4 57 51.8	14.742	16	0 14 9.10	2.3004	6 52 52.7	14.196
17	22 25 55.57	2.3209	4 43 6.3	14.773	17	0 16 27.14	2.3010	7 7 2.9	14.142
18	22 28 14.78	2.3194	4 28 19.0	14.802	18	0 18 45.22	2.3016	7 21 9.8	14.087
19	22 30 33.90	2.3181	4 13 30.1	14.828	19	0 21 3.33	2.3022	7 35 13.4	14.031
20	22 32 52.95	2.3167	3 58 39.6	14.853	20	0 23 21.48	2.3028	7 49 13.5	13.972
21	22 35 11.91	2.3153	3 43 47.7	14.877	21	0 25 39.67	2.3035	8 3 10.1	13.913
22	22 37 30.79	2.3141	3 28 54.4	14.898	22	0 27 57.90	2.3042	8 17 3.1	13.852
23	22 39 49.60	2.3129	S. 3 13 59.9	14.918	23	0 30 16.17	2.3049	N. 8 30 52.3	13.789
MONDAY 18.					WEDNESDAY 20.				
0	22 42 8.34	2.3117	S. 2 59 4.2	14.936	0	0 32 34.49	2.3057	N. 8 44 37.8	13.726
1	22 44 27.01	2.3106	2 44 7.6	14.952	1	0 34 52.86	2.3065	8 58 19.4	13.659
2	22 46 45.61	2.3094	2 29 10.0	14.967	2	0 37 11.27	2.3073	9 11 56.9	13.592
3	22 49 4.14	2.3083	2 14 11.6	14.979	3	0 39 29.73	2.3082	9 25 30.4	13.523
4	22 51 22.61	2.3073	1 59 12.5	14.989	4	0 41 48.25	2.3091	9 38 59.7	13.453
5	22 53 41.02	2.3064	1 44 12.9	14.997	5	0 44 6.82	2.3099	9 52 24.8	13.382
6	22 55 59.38	2.3055	1 29 12.8	15.005	6	0 46 25.44	2.3108	10 5 45.5	13.308
7	22 58 17.68	2.3047	1 14 12.3	15.011	7	0 48 44.12	2.3117	10 19 1.8	13.234
8	23 0 35.94	2.3038	0 59 11.5	15.014	8	0 51 2.85	2.3127	10 32 13.6	13.158
9	23 2 54.14	2.3030	0 44 10.6	15.015	9	0 53 21.65	2.3137	10 45 20.8	13.081
10	23 5 12.30	2.3023	0 29 9.7	15.015	10	0 55 40.50	2.3147	10 58 23.3	13.002
11	23 7 30.42	2.3017	S. 0 14 8.8	15.013	11	0 57 59.41	2.3157	11 11 21.1	12.922
12	23 9 48.50	2.3010	N. 0 0 51.9	15.009	12	1 0 18.39	2.3168	11 24 14.0	12.841
13	23 12 6.54	2.3003	0 15 52.3	15.003	13	1 2 37.43	2.3178	11 37 2.0	12.757
14	23 14 24.54	2.2998	0 30 52.3	14.997	14	1 4 56.53	2.3188	11 49 44.9	12.673
15	23 16 42.52	2.2993	0 45 51.9	14.988	15	1 7 15.69	2.3199	12 2 22.8	12.588
16	23 19 0.46	2.2988	1 0 50.8	14.976	16	1 9 34.92	2.3211	12 14 55.5	12.502
17	23 21 18.38	2.2984	1 15 49.0	14.963	17	1 11 54.22	2.3222	12 27 23.0	12.414
18	23 23 36.27	2.2980	1 30 46.4	14.949	18	1 14 13.58	2.3233	12 39 45.2	12.324
19	23 25 54.14	2.2977	1 45 42.9	14.933	19	1 16 33.01	2.3244	12 52 1.9	12.233
20	23 28 11.99	2.2974	2 0 38.4	14.915	20	1 18 52.51	2.3255	13 4 13.2	12.142
21	23 30 29.83	2.2972	2 15 32.7	14.895	21	1 21 12.07	2.3267	13 16 19.0	12.049
22	23 32 47.66	2.2971	2 30 25.8	14.874	22	1 23 31.71	2.3278	13 28 19.1	11.954
23	23 35 5.48	2.2968	2 45 17.6	14.851	23	1 25 51.41	2.3289	13 40 13.5	11.859
24	23 37 23.28	2.2967	N. 3 0 7.9	14.826	24	1 28 11.18	2.3301	N. 13 52 2.2	11.763

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 21.					SATURDAY 23.				
0	1 28 11.18	a. 3301	N. 13 52 2.2	11.763	0	3 21 7.23	a. 3651	N. 21 7 13.0	6.091
1	1 30 31.02	a. 3312	14 3 45.1	11.665	1	3 23 29.13	a. 3649	21 13 14.5	5.958
2	1 32 50.93	a. 3324	14 15 22.0	11.566	2	3 25 51.02	a. 3647	21 19 8.0	5.825
3	1 35 10.91	a. 3336	14 26 53.0	11.466	3	3 28 12.89	a. 3643	21 24 53.5	5.693
4	1 37 30.96	a. 3347	14 38 17.9	11.365	4	3 30 34.74	a. 3641	21 30 31.1	5.561
5	1 39 51.08	a. 3358	14 49 36.8	11.263	5	3 32 56.58	a. 3637	21 36 0.8	5.427
6	1 42 11.26	a. 3369	15 0 49.5	11.159	6	3 35 18.39	a. 3633	21 41 22.4	5.293
7	1 44 31.51	a. 3381	15 11 55.9	10.055	7	3 37 40.17	a. 3627	21 46 36.0	5.160
8	1 46 51.83	a. 3392	15 22 56.1	10.950	8	3 40 1.92	a. 3622	21 51 41.6	5.027
9	1 49 12.22	a. 3404	15 33 49.9	10.843	9	3 42 23.64	a. 3617	21 56 39.2	4.893
10	1 51 32.68	a. 3415	15 44 37.3	10.736	10	3 44 45.32	a. 3610	22 1 28.8	4.759
11	1 53 53.20	a. 3426	15 55 18.2	10.627	11	3 47 6.96	a. 3602	22 6 10.3	4.625
12	1 56 13.79	a. 3437	16 5 52.6	10.518	12	3 49 28.55	a. 3595	22 10 43.8	4.492
13	1 58 34.45	a. 3447	16 16 20.4	10.407	13	3 51 50.10	a. 3587	22 15 9.3	4.357
14	2 0 55.16	a. 3457	16 26 41.5	10.296	14	3 54 11.59	a. 3577	22 19 26.7	4.223
15	2 3 15.94	a. 3469	16 36 55.9	10.184	15	3 56 33.03	a. 3568	22 23 36.1	4.090
16	2 5 36.79	a. 3480	16 47 3.6	10.072	16	3 58 54.41	a. 3558	22 27 37.5	3.956
17	2 7 57.70	a. 3490	16 57 4.5	9.957	17	4 1 15.73	a. 3548	22 31 30.8	3.822
18	2 10 18.67	a. 3499	17 6 58.5	9.842	18	4 3 36.99	a. 3537	22 35 16.1	3.687
19	2 12 39.69	a. 3509	17 16 45.5	9.726	19	4 5 58.17	a. 3524	22 38 53.3	3.554
20	2 15 0.78	a. 3519	17 26 25.6	9.610	20	4 8 19.28	a. 3512	22 42 22.6	3.421
21	2 17 21.92	a. 3527	17 35 58.7	9.493	21	4 10 40.32	a. 3500	22 45 43.8	3.287
22	2 19 43.11	a. 3537	17 45 24.8	9.375	22	4 13 1.28	a. 3486	22 48 57.0	3.153
23	2 22 4.36	a. 3546	N. 17 54 43.7	9.256	23	4 15 22.15	a. 3471	N. 22 52 2.2	3.019
FRIDAY 22.					SUNDAY 24.				
0	2 24 25.66	a. 3554	N. 18 3 55.5	9.137	0	4 17 42.93	a. 3456	N. 22 54 59.3	a. 886
1	2 26 47.01	a. 3562	18 13 0.1	9.016	1	4 20 3.62	a. 3441	22 57 48.5	a. 753
2	2 29 8.41	a. 3571	18 21 57.4	8.894	2	4 22 24.22	a. 3426	23 0 29.7	a. 620
3	2 31 29.86	a. 3578	18 30 47.4	8.773	3	4 24 44.73	a. 3409	23 3 2.9	a. 487
4	2 33 51.35	a. 3586	18 39 30.1	8.651	4	4 27 5.13	a. 3391	23 5 28.1	a. 354
5	2 36 12.89	a. 3592	18 48 5.5	8.527	5	4 29 25.42	a. 3373	23 7 45.4	a. 222
6	2 38 34.46	a. 3599	18 56 33.4	8.403	6	4 31 45.61	a. 3355	23 9 54.8	a. 91
7	2 40 56.08	a. 3606	19 4 53.9	8.279	7	4 34 5.68	a. 3336	23 11 56.3	a. 958
8	2 43 17.73	a. 3612	19 13 6.9	8.154	8	4 36 25.64	a. 3317	23 13 49.8	a. 827
9	2 45 39.42	a. 3617	19 21 12.4	8.029	9	4 38 45.48	a. 3296	23 15 35.5	a. 696
10	2 48 1.14	a. 3622	19 29 10.4	7.902	10	4 41 5.19	a. 3275	23 17 13.3	a. 564
11	2 50 22.89	a. 3627	19 37 0.7	7.776	11	4 43 24.78	a. 3254	23 18 43.2	a. 433
12	2 52 44.67	a. 3632	19 44 43.5	7.649	12	4 45 44.24	a. 3232	23 20 5.3	a. 302
13	2 55 6.47	a. 3636	19 52 18.6	7.522	13	4 48 3.57	a. 3210	23 21 19.5	a. 172
14	2 57 28.30	a. 3640	19 59 46.1	7.393	14	4 50 22.76	a. 3187	23 22 26.0	a. 42
15	2 59 50.15	a. 3643	20 7 5.8	7.264	15	4 52 41.81	a. 3162	23 23 24.6	a. 912
16	3 2 12.01	a. 3645	20 14 17.8	7.136	16	4 55 0.71	a. 3138	23 24 15.5	a. 784
17	3 4 33.89	a. 3647	20 21 22.1	7.007	17	4 57 19.47	a. 3114	23 24 58.7	a. 656
18	3 6 55.78	a. 3649	20 28 18.6	6.877	18	4 59 38.08	a. 3089	23 25 34.2	a. 527
19	3 9 17.68	a. 3651	20 35 7.3	6.747	19	5 1 56.54	a. 3063	23 26 2.0	a. 399
20	3 11 39.59	a. 3652	20 41 48.2	6.616	20	5 4 14.84	a. 3037	23 26 22.1	a. 272
21	3 14 1.50	a. 3652	20 48 21.2	6.485	21	5 6 32.99	a. 3011	23 26 34.6	a. 145
22	3 16 23.41	a. 3652	20 54 46.4	6.353	22	5 8 50.97	a. 2983	23 26 39.5	+ a. 018
23	3 18 45.32	a. 3652	21 1 3.6	6.222	23	5 11 8.78	a. 2955	23 26 36.8	- a. 107
24	3 21 7.23	a. 3651	N. 21 7 13.0	6.091	24	5 13 26.43	a. 2927	N. 23 26 26.6	a. 233

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 25.					WEDNESDAY 27.				
0	5 13 26.43	2.2927	N.23 26 26.6	0.233	0	6 59 29.59	2.1165	N.21 1 30.8	5.532
1	5 15 43.90	2.2898	23 26 8.8	0.398	1	7 1 36 45	2.1122	20 55 54.8	5.647
2	5 18 1.20	2.2869	23 25 43.6	0.482	2	7 3 43.06	2.1082	20 50 13.1	5.741
3	5 20 18.33	2.2839	23 25 10.9	0.607	3	7 5 49.43	2.1041	20 44 25.9	5.833
4	5 22 35.27	2.2808	23 24 30.7	0.732	4	7 7 55.55	2.1000	20 38 33.2	5.924
5	5 24 52.03	2.2778	23 23 43.1	0.854	5	7 10 1.43	2.0960	20 32 35.0	6.006
6	5 27 8.61	2.2747	23 22 48.2	0.977	6	7 12 7.07	2.0919	20 26 31.3	6.106
7	5 29 24.99	2.2715	23 21 45.9	1.098	7	7 14 12.46	2.0878	20 20 22.3	6.195
8	5 31 41.19	2.2683	23 20 36.4	1.219	8	7 16 17.61	2.0837	20 14 7.9	6.284
9	5 33 57.19	2.2650	23 19 19.6	1.341	9	7 18 22.51	2.0797	20 7 48.2	6.372
10	5 36 12.99	2.2617	23 17 55.5	1.462	10	7 20 27.18	2.0757	20 1 23.3	6.459
11	5 38 28.60	2.2584	23 16 24.2	1.582	11	7 22 31.60	2.0717	19 54 53.1	6.546
12	5 40 44.00	2.2550	23 14 45.7	1.701	12	7 24 35.78	2.0677	19 48 17.8	6.632
13	5 42 59.20	2.2517	23 13 0.1	1.819	13	7 26 39.72	2.0637	19 41 37.3	6.717
14	5 45 14.20	2.2486	23 11 7.4	1.937	14	7 28 43.42	2.0597	19 34 51.8	6.801
15	5 47 28.99	2.2447	23 9 7.7	2.054	15	7 30 46.89	2.0558	19 28 1.2	6.885
16	5 49 43.57	2.2412	23 7 0.9	2.172	16	7 32 50.12	2.0518	19 21 5.6	6.967
17	5 51 57.94	2.2377	23 4 47.1	2.288	17	7 34 53.11	2.0478	19 14 5.1	7.050
18	5 54 12.09	2.2340	23 2 26.4	2.402	18	7 36 55.86	2.0439	19 6 59.6	7.132
19	5 56 26.02	2.2304	22 59 58.8	2.517	19	7 38 58.38	2.0400	18 59 49.3	7.212
20	5 58 39.74	2.2268	22 57 24.3	2.632	20	7 41 0.66	2.0360	18 52 34.2	7.292
21	6 0 53.24	2.2231	22 54 42.9	2.747	21	7 43 2.72	2.0323	18 45 14.3	7.372
22	6 3 6.51	2.2193	22 51 54.7	2.851	22	7 45 4.54	2.0284	18 37 49.6	7.450
23	6 5 19.56	2.2157	N.22 48 59.8	2.971	23	7 47 6.13	2.0246	N.18 30 20.3	7.527
TUESDAY 26.					THURSDAY 28.				
0	6 7 32.39	2.2120	N.22 45 58.2	3.082	0	7 49 7.49	2.0207	N.18 22 46.3	7.605
1	6 9 44.99	2.2082	22 42 49.9	3.194	1	7 51 8.62	2.0170	18 15 7.7	7.681
2	6 11 57.37	2.2043	22 39 34.9	3.304	2	7 53 9.53	2.0132	18 7 24.6	7.756
3	6 14 9.51	2.2004	22 36 13.4	3.413	3	7 55 10.21	2.0095	17 59 37.0	7.831
4	6 16 21.42	2.1966	22 32 45.3	3.523	4	7 57 10.67	2.0057	17 51 44.8	7.906
5	6 18 33.10	2.1927	22 29 10.6	3.632	5	7 59 10.90	2.0021	17 43 48.3	7.978
6	6 20 44.55	2.1888	22 25 29.5	3.738	6	8 1 10.92	1.9983	17 35 47.4	8.050
7	6 22 55.76	2.1848	22 21 42.0	3.845	7	8 3 10.72	1.9948	17 27 42.1	8.121
8	6 25 6.73	2.1809	22 17 48.1	3.952	8	8 5 10.30	1.9912	17 19 32.5	8.196
9	6 27 17.47	2.1770	22 13 47.8	4.057	9	8 7 9.66	1.9876	17 11 18.6	8.266
10	6 29 27.97	2.1730	22 9 41.2	4.162	10	8 9 8.81	1.9841	17 3 0.6	8.336
11	6 31 38.23	2.1690	22 5 28.3	4.266	11	8 11 7.75	1.9805	16 54 38.3	8.405
12	6 33 48.25	2.1650	22 1 9.3	4.368	12	8 13 6.47	1.9770	16 46 12.0	8.472
13	6 35 58.03	2.1610	21 56 44.1	4.472	13	8 15 4.99	1.9736	16 37 41.6	8.541
14	6 38 7.57	2.1570	21 52 12.7	4.574	14	8 17 3.30	1.9702	16 29 7.1	8.608
15	6 40 16.87	2.1530	21 47 35.2	4.676	15	8 19 1.41	1.9667	16 20 28.6	8.674
16	6 42 25.93	2.1489	21 42 51.6	4.776	16	8 20 59.31	1.9633	16 11 46.2	8.740
17	6 44 34.74	2.1448	21 38 2.1	4.875	17	8 22 57.01	1.9600	16 2 59.8	8.806
18	6 46 43.31	2.1407	21 33 6.6	4.974	18	8 24 54.51	1.9568	15 54 9.5	8.870
19	6 48 51.63	2.1367	21 28 5.2	5.073	19	8 26 51.82	1.9536	15 45 15.4	8.933
20	6 50 59.71	2.1327	21 22 57.9	5.172	20	8 28 48.94	1.9505	15 36 17.5	8.997
21	6 53 7.55	2.1286	21 17 44.7	5.267	21	8 30 45.86	1.9471	15 27 15.8	9.059
22	6 55 15.14	2.1245	21 12 25.8	5.363	22	8 32 42.59	1.9439	15 18 10.4	9.120
23	6 57 22.49	2.1204	21 7 1.1	5.458	23	8 34 39.13	1.9408	15 9 1.4	9.181
24	6 59 29.59	2.1163	N.21 1 30.8	5.552	24	8 36 35.49	1.9377	N.14 59 48.7	9.242

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 29.					SUNDAY, OCTOBER 1.				
0	h m s				0	h m s			
1	8 36 35.49	1.9377	N. 14 59 48.7	9.342	10	6 50.48	1.8402	N. 6 39 30.8	11.352
2	8 38 31.66	1.9347	14 50 32.4	9.301					
3	8 40 27.65	1.9317	14 41 12.6	9.360					
4	8 42 23.47	1.9287	14 31 49.2	9.418					
5	8 44 19.10	1.9257	14 22 22.4	9.475					
6	8 46 14.56	1.9229	14 12 52.2	9.532					
7	8 48 9.85	1.9200	14 3 18.5	9.589					
8	8 50 4.97	1.9170	13 53 41.5	9.644					
9	8 51 59.92	1.9145	13 44 1.2	9.698					
10	8 53 54.71	1.9118	13 34 17.7	9.753					
11	8 55 49.34	1.9091	13 24 30.9	9.807					
12	8 57 43.80	1.9064	13 14 40.9	9.860					
13	8 59 38.11	1.9038	13 4 47.7	9.912					
14	9 1 32.26	1.9012	12 54 51.5	9.962					
15	9 3 26.26	1.8987	12 44 52.2	10.013					
16	9 5 20.10	1.8962	12 34 49.9	10.063					
17	9 7 13.80	1.8937	12 24 44.6	10.113					
18	9 9 7.35	1.8913	12 14 36.3	10.162					
19	9 11 0.76	1.8890	12 4 25.1	10.210					
20	9 12 54.03	1.8867	11 54 11.1	10.257					
21	9 14 47.16	1.8844	11 43 54.2	10.304					
22	9 16 40.16	1.8822	11 33 34.6	10.350					
23	9 18 33.03	1.8801	11 23 12.2	10.397					
24	9 20 25.77	1.8779	N. 11 12 47.0	10.442					
SATURDAY 30.					PHASES OF THE MOON.				
0	9 22 18.38	1.8758	N. 11 2 19.2	10.485					
1	9 24 10.87	1.8737	10 51 48.8	10.528					
2	9 26 3.23	1.8717	10 41 15.8	10.572					
3	9 27 55.48	1.8698	10 30 40.2	10.614					
4	9 29 47.61	1.8680	10 20 2.1	10.656					
5	9 31 39.64	1.8662	10 9 21.5	10.697					
6	9 33 31.55	1.8643	9 58 38.5	10.737					
7	9 35 23.35	1.8625	9 47 53.0	10.777					
8	9 37 15.05	1.8608	9 37 5.2	10.816					
9	9 39 6.65	1.8592	9 26 15.1	10.854					
10	9 40 58.15	1.8575	9 15 22.7	10.892					
11	9 42 49.55	1.8559	9 4 28.0	10.929					
12	9 44 40.86	1.8544	8 53 31.2	10.965					
13	9 46 32.08	1.8530	8 42 32.2	11.001					
14	9 48 23.22	1.8516	8 31 31.1	11.037					
15	9 50 14.27	1.8502	8 20 27.8	11.072					
16	9 52 5.24	1.8488	8 9 22.5	11.105					
17	9 53 56.13	1.8476	7 58 15.2	11.138					
18	9 55 46.95	1.8464	7 47 5.9	11.171					
19	9 57 37.70	1.8452	7 35 54.7	11.203					
20	9 59 28.38	1.8442	7 24 41.6	11.234					
21	10 1 19.00	1.8431	7 13 26.6	11.266					
22	10 3 9.55	1.8420	7 2 9.7	11.296					
23	10 5 0.04	1.8411	6 50 51.1	11.324					
24	10 6 50.48	1.8402	N. 6 39 30.8	11.352					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	$\alpha$ Arietis	W.	83 23 37	3093	84 51 55	3095	86 20 11	3096	87 48 25	3098
	Aldebaran	W.	50 37 4	3123	52 4 46	3123	53 32 28	3123	55 0 10	3122
	SUN	E.	39 47 55	3480	38 27 8	3484	37 6 26	3489	35 45 50	3494
2	$\alpha$ Arietis	W.	95 9 13	3102	96 37 20	3102	98 5 27	3102	99 33 34	3102
	Aldebaran	W.	62 18 50	3119	63 46 37	3118	65 14 25	3117	66 42 14	3115
	SUN	E.	29 4 12	3521	27 44 11	3527	26 24 17	3535	25 4 31	3543
6	SUN	W.	15 45 33	3554	17 4 58	3518	18 25 2	3489	19 45 38	3464
	JUPITER	E.	38 46 5	3084	37 17 36	3081	35 49 3	3078	34 20 27	3077
	Antares	E.	69 28 41	2991	67 58 17	2985	66 27 46	2980	64 57 8	2974
	SATURN	E.	78 49 12	2996	77 18 54	2990	75 48 29	2985	74 17 57	2979
	$\alpha$ Aquilæ	E.	119 59 31	3637	118 41 37	3614	117 23 18	3591	116 4 34	3570
7	SUN	W.	26 34 45	3373	27 57 32	3359	29 20 35	3346	30 43 53	3333
	Antares	E.	57 22 10	2945	55 50 48	2938	54 19 17	2931	52 47 38	2924
	SATURN	E.	66 43 26	2948	65 12 8	2942	63 40 42	2935	62 9 7	2928
	$\alpha$ Aquilæ	E.	109 25 20	3476	108 4 29	3460	106 43 20	3444	105 21 53	3430
8	SUN	W.	37 43 54	3276	39 8 34	3264	40 33 28	3253	41 58 34	3242
	Antares	E.	45 7 13	2890	43 34 41	2883	42 2 0	2875	40 29 9	2867
	SATURN	E.	54 28 58	2891	52 56 28	2883	51 23 47	2875	49 50 56	2867
	$\alpha$ Aquilæ	E.	98 30 44	3365	97 7 47	3352	95 44 36	3342	94 21 13	3332
9	SUN	W.	49 7 26	3185	50 33 53	3174	52 0 33	3162	53 27 28	3150
	Antares	E.	32 42 27	2829	31 8 37	2821	29 34 37	2814	28 0 27	2807
	SATURN	E.	42 3 58	2823	40 30 0	2813	38 55 49	2804	37 21 26	2795
	$\alpha$ Aquilæ	E.	87 21 25	3285	85 56 56	3277	84 32 18	3270	83 7 32	3263
	Fomalhaut	E.	113 22 12	3350	111 58 58	3329	110 35 20	3308	109 11 18	3288
10	SUN	W.	60 45 40	3088	62 14 4	3076	63 42 43	3063	65 11 38	3049
	Spica	W.	25 48 11	2743	27 23 54	2729	28 59 55	2716	30 36 13	2703
	MARS	W.	25 35 36	3026	27 5 16	3008	28 35 19	2989	30 5 45	2972
	$\alpha$ Aquilæ	E.	76 1 48	3236	74 36 22	3233	73 10 52	3213	71 45 19	3212
	Fomalhaut	E.	102 5 30	3198	100 39 18	3182	99 12 47	3166	97 45 57	3150
	$\alpha$ Pegasi	E.	122 50 4	2918	121 18 8	2901	119 45 50	2883	118 13 10	2866
11	SUN	W.	72 40 25	2981	74 11 2	2966	75 41 57	2952	77 13 10	2938
	Spica	W.	38 42 12	2636	40 20 18	2622	41 58 43	2608	43 37 27	2595
	MARS	W.	37 43 19	2899	39 15 52	2873	40 48 46	2856	42 22 1	2841
	JUPITER	W.	23 32 13	2772	25 7 18	2750	26 42 52	2728	28 18 55	2707
	$\alpha$ Aquilæ	E.	64 37 20	3234	63 11 51	3238	61 46 27	3215	60 21 11	3203
	Fomalhaut	E.	90 27 19	3081	88 58 46	3068	87 29 57	3056	86 0 53	3044
	$\alpha$ Pegasi	E.	110 24 18	2783	108 49 28	2766	107 14 16	2750	105 38 43	2735
12	SUN	W.	84 53 57	2862	86 27 5	2847	88 0 32	2831	89 34 20	2815
	Spica	W.	51 55 52	2584	53 36 32	2569	55 17 33	2554	56 58 54	2540
	MARS	W.	50 13 24	2761	51 48 43	2744	53 24 24	2729	55 0 26	2713
	JUPITER	W.	36 25 42	2615	38 4 17	2598	39 43 15	2580	41 22 37	2564
	$\alpha$ Aquilæ	E.	53 18 7	3329	51 54 29	3353	50 31 19	3331	49 8 41	3314
	Fomalhaut	E.	78 32 15	2996	77 1 57	2988	75 31 29	2981	74 0 52	2975
	$\alpha$ Pegasi	E.	97 35 48	2657	95 58 11	2643	94 20 14	2627	92 41 56	2612

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	α Arietis	W.	89 16 37	3099	90 44 48	3101	92 12 57	3101	93 41 5	3101
	Aldebaran	W.	56 27 53	3122	57 55 36	3121	59 23 20	3120	60 51 5	3120
	SUN	E.	34 25 19	3499	33 4 54	3504	31 44 34	3509	30 24 20	3515
2	α Arietis	W.	101 1 41	3101	102 29 49	3101	103 57 57	3101	105 26 6	3099
	Aldebaran	W.	68 10 5	3114	69 37 58	3112	71 5 53	3110	72 33 50	3109
	SUN	E.	23 44 54	3553	22 25 28	3565	21 6 15	3578	19 47 17	3597
6	SUN	W.	21 6 42	3442	22 28 11	3422	23 50 3	3404	25 12 15	3388
	JUPITER	E.	32 51 49	3074	31 23 8	3073	29 54 26	3072	28 25 42	3071
	Antares	E.	63 26 23	2969	61 55 31	2963	60 24 32	2957	58 53 25	2950
	SATURN	E.	72 47 18	2973	71 16 32	2967	69 45 38	2961	68 14 36	2954
	α Aquilæ	E.	114 45 27	3549	113 25 57	3529	112 6 5	3510	110 45 52	3493
7	SUN	W.	32 7 26	3321	33 31 13	3310	34 55 13	3298	36 19 27	3287
	Antares	E.	51 15 50	2918	49 43 54	2911	48 11 49	2905	46 39 36	2897
	SATURN	E.	60 37 24	2921	59 5 32	2913	57 33 30	2906	56 1 19	2898
	α Aquilæ	E.	104 0 10	3415	102 38 11	3402	101 15 57	3389	99 53 28	3376
8	SUN	W.	43 23 54	3231	44 49 27	3220	46 15 13	3208	47 41 13	3197
	Antares	E.	38 56 8	2859	37 22 57	2852	35 49 37	2845	34 16 7	2837
	SATURN	E.	48 17 55	2859	46 44 43	2849	45 11 19	2841	43 37 44	2832
	α Aquilæ	E.	92 57 38	3321	91 33 51	3312	90 9 53	3302	88 45 44	3294
9	SUN	W.	54 54 37	3138	56 22 1	3126	57 49 39	3114	59 17 32	3101
	Antares	E.	26 26 8	2800	24 51 40	2794	23 17 4	2788	21 42 21	2785
	SATURN	E.	35 46 51	2785	34 12 3	2775	32 37 2	2765	31 1 48	2755
	α Aquilæ	E.	81 42 37	3256	80 17 34	3251	78 52 25	3245	77 27 9	3241
	Fomalhaut	E.	107 46 52	3268	106 22 3	3250	104 56 53	3232	103 31 22	3214
10	SUN	W.	66 40 50	3036	68 10 18	3022	69 40 3	3009	71 10 5	2994
	Spica	W.	32 12 49	2690	33 49 42	2676	35 26 54	2663	37 4 24	2649
	MARS	W.	31 36 33	2954	33 7 43	2938	34 39 14	2921	36 11 6	2905
	α Aquilæ	E.	70 19 43	3227	68 54 6	3227	67 28 29	3222	66 2 53	3211
	Fomalhaut	E.	96 18 48	3135	94 51 21	3121	93 23 37	3107	91 55 36	3094
	α Pegasi	E.	116 40 7	2848	115 6 42	2832	113 32 56	2815	111 58 48	2798
11	SUN	W.	78 44 41	2923	80 16 31	2908	81 48 40	2892	83 21 9	2877
	Spica	W.	45 16 29	2581	46 55 50	2566	48 35 31	2552	50 15 32	2538
	MARS	W.	43 55 36	2825	45 29 32	2809	47 3 48	2793	48 38 25	2776
	JUPITER	W.	29 55 26	2687	31 32 23	2669	33 9 45	2651	34 47 31	2632
	α Aquilæ	E.	58 56 5	3264	57 31 11	3276	56 6 31	3291	54 42 9	3308
	Fomalhaut	E.	84 31 35	3033	83 2 3	3023	81 32 19	3014	80 2 23	3004
	α Pegasi	E.	104 2 50	2719	102 26 35	2704	100 50 0	2688	99 13 4	2673
12	SUN	W.	91 8 28	2800	92 42 56	2784	94 17 45	2763	95 52 55	2753
	Spica	W.	58 40 36	2465	60 22 38	2450	62 5 2	2435	63 47 47	2420
	MARS	W.	56 36 49	2696	58 13 34	2681	59 50 40	2664	61 28 8	2649
	JUPITER	W.	43 2 22	2547	44 42 30	2530	46 23 1	2514	48 3 55	2497
	α Aquilæ	E.	47 46 40	3432	46 25 22	3497	45 4 54	3548	43 45 23	3609
	Fomalhaut	E.	72 30 8	2969	70 59 17	2965	69 28 21	2963	67 57 22	2961
	α Pegasi	E.	91 3 18	2598	89 24 20	2583	87 45 2	2569	86 5 24	2554

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
13	SUN W.	97 28 25	2736	99 4 17	2721	100 40 29	2705	102 17 2	2689
	Spica W.	65 30 53	2405	67 14 20	2390	68 58 9	2375	70 42 19	2360
	MARS W.	63 5 57	2632	64 44 8	2616	66 22 41	2600	68 1 36	2584
	JUPITER W.	49 45 12	2482	51 26 51	2465	53 8 53	2449	54 51 18	2433
	Fomalhaut E.	66 26 20	2961	64 55 18	2962	63 24 17	2965	61 53 20	2969
	α Pegasi E.	84 25 26	2540	82 45 9	2527	81 4 33	2513	79 23 38	2500
14	SUN W.	110 25 1	2612	112 3 39	2598	113 42 37	2583	115 21 55	2569
	Spica W.	79 28 33	2287	81 14 51	2272	83 1 31	2258	84 48 32	2245
	MARS W.	76 21 38	2506	78 2 43	2490	79 44 10	2476	81 25 57	2461
	JUPITER W.	63 28 57	2356	65 13 35	2342	66 58 34	2326	68 43 55	2312
	Antares W.	33 59 40	2302	35 45 36	2286	37 31 56	2271	39 18 38	2256
	Fomalhaut E.	54 21 4	3030	52 51 29	3053	51 22 22	3078	49 53 46	3110
	α Pegasi E.	70 54 38	2440	69 12 0	2430	67 29 8	2419	65 46 1	2410
	α Arietis E.	113 44 32	2312	111 58 50	2298	110 12 47	2283	108 26 22	2268
15	SUN W.	123 43 15	2502	125 24 26	2489	127 5 54	2476	128 47 38	2467
	Spica W.	93 48 40	2178	95 37 40	2166	97 26 59	2154	99 16 36	2142
	MARS W.	89 59 59	2391	91 43 46	2378	93 27 52	2366	95 12 16	2353
	JUPITER W.	77 35 50	2243	79 23 13	2231	81 10 54	2218	82 58 54	2206
	Antares W.	48 17 36	2185	50 6 26	2172	51 55 35	2160	53 45 3	2148
	SATURN W.	38 36 0	2192	40 24 39	2179	42 13 38	2167	44 2 55	2155
	α Pegasi E.	57 7 34	2378	55 23 27	2375	53 39 16	2373	51 55 2	2372
	α Arietis E.	99 29 5	2200	97 40 37	2188	95 51 51	2176	94 2 47	2163
16	JUPITER W.	92 3 6	2155	93 52 42	2145	95 42 32	2137	97 32 35	2127
	Antares W.	62 56 45	2094	64 47 53	2085	66 39 15	2077	68 30 50	2069
	SATURN W.	53 13 41	2102	55 4 37	2093	56 55 47	2085	58 47 10	2077
	α Arietis E.	84 53 10	2112	83 2 23	2103	81 11 35	2096	79 20 29	2088
	Aldebaran E.	117 44 52	2126	115 54 33	2116	114 3 58	2107	112 13 9	2098
17	Antares W.	77 51 32	2038	79 44 7	2033	81 36 49	2030	83 29 37	2027
	SATURN W.	68 6 50	2046	69 59 13	2042	71 51 42	2039	73 44 16	2035
	α Arietis E.	70 2 23	2061	68 10 23	2057	66 18 17	2054	64 26 7	2052
	Aldebaran E.	102 56 3	2064	101 4 9	2059	99 12 7	2055	97 19 59	2053
18	Antares W.	92 54 19	2023	94 47 17	2025	96 40 12	2028	98 33 3	2030
	SATURN W.	83 7 52	2032	85 0 36	2033	86 53 18	2035	88 45 57	2039
	α Aquilæ W.	45 25 36	2050	46 54 47	2057	48 25 16	2054	49 56 52	2057
	α Arietis E.	55 5 1	2056	53 12 54	2060	51 20 53	2064	49 28 58	2069
	Aldebaran E.	87 58 33	2048	86 6 14	2050	84 13 58	2053	82 21 46	2055
19	SATURN W.	98 7 39	2064	99 59 33	2072	101 51 16	2079	103 42 47	2088
	α Aquilæ W.	57 47 29	2732	59 23 26	2713	60 59 49	2697	62 36 33	2685
	α Arietis E.	40 12 1	2113	38 21 22	2126	36 31 2	2140	34 41 4	2157
	Aldebaran E.	73 2 22	2083	71 10 57	2092	69 19 45	2100	67 28 46	2109
	Pollux E.	114 53 39	2113	113 2 59	2118	111 12 28	2124	109 22 6	2132
20	α Aquilæ W.	70 43 14	2659	72 20 49	2660	73 58 22	2664	75 35 50	2669
	Fomalhaut W.	45 46 6	3090	47 14 28	3046	48 43 44	3009	50 13 46	2977
	Aldebaran E.	58 17 51	2169	56 28 36	2183	54 39 43	2198	52 51 12	2213
	Pollux E.	100 13 25	2179	98 24 26	2191	96 35 45	2204	94 47 23	2216

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
13	SUN W.	103 53 56	2674	105 31 11	2658	107 8 47	2643	108 46 44	2628
	Spica W.	72 26 51	2346	74 11 44	2331	75 56 59	2316	77 42 35	2301
	MARS W.	69 40 53	2568	71 20 32	2553	73 0 32	2537	74 40 54	2521
	JUPITER W.	56 34 5	2417	58 17 15	2402	60 0 47	2387	61 44 41	2371
	Fomalhaut E.	60 22 29	2977	58 51 47	2985	57 21 16	2998	55 51 1	3013
	α Pegasi E.	77 42 25	2487	76 0 54	2475	74 19 5	2463	72 37 0	2451
14	SUN W.	117 1 33	2555	118 41 30	2540	120 21 47	2527	122 2 22	2515
	Spica W.	86 35 53	2231	88 23 35	2217	90 11 37	2204	91 59 59	2191
	MARS W.	83 8 5	2447	84 50 33	2432	86 33 22	2418	88 16 31	2405
	JUPITER W.	70 29 37	2298	72 15 40	2284	74 2 3	2270	75 48 47	2257
	Antares W.	41 5 43	2241	42 53 9	2227	44 40 57	2212	46 29 6	2198
	Fomalhaut E.	48 25 48	3146	46 58 34	3128	45 32 10	3113	44 6 45	3095
	α Pegasi E.	64 2 41	2402	62 19 9	2394	60 35 26	2388	58 51 34	2382
	α Arietis E.	106 39 36	2254	104 52 29	2240	103 5 1	2227	101 17 13	2213
15	SUN W.	130 29 38	2456	132 11 53	2446	133 54 22	2437	135 37 4	2428
	Spica W.	101 6 31	2132	102 56 42	2120	104 47 10	2110	106 37 54	2100
	MARS W.	96 56 58	2342	98 41 57	2331	100 27 12	2320	102 12 43	2310
	JUPITER W.	84 47 12	2195	86 35 47	2184	88 24 38	2174	90 13 44	2164
	Antares W.	55 34 49	2136	57 24 53	2125	59 15 14	2114	61 5 52	2104
	SATURN W.	45 52 31	2143	47 42 24	2132	49 32 34	2122	51 23 0	2112
	α Pegasi E.	50 10 47	2374	48 26 35	2378	46 42 28	2384	44 58 30	2392
	α Arietis E.	92 13 24	2152	90 23 44	2141	88 33 48	2131	86 43 36	2122
16	JUPITER W.	99 22 50	2022	101 13 15	2115	103 3 51	2109	104 54 36	2104
	Antares W.	70 22 37	2061	72 14 36	2055	74 6 45	2048	75 59 4	2042
	SATURN W.	60 38 45	2070	62 30 31	2062	64 22 28	2056	66 14 35	2051
	α Arietis E.	77 29 11	2081	75 37 42	2075	73 46 4	2069	71 54 17	2064
	Aldebaran E.	110 22 7	2090	108 30 52	2083	106 39 26	2075	104 47 49	2070
17	Antares W.	85 22 29	2025	87 15 24	2023	89 8 22	2023	91 1 20	2023
	SATURN W.	75 36 55	2033	77 29 37	2032	79 22 21	2032	81 15 6	2031
	α Arietis E.	62 33 54	2052	60 41 40	2051	58 49 25	2052	56 57 12	2053
	Aldebaran E.	95 27 47	2050	93 35 31	2049	91 43 13	2048	89 50 53	2048
18	Antares W.	100 25 50	2034	102 18 31	2039	104 11 5	2044	106 3 31	2050
	SATURN W.	90 38 31	2042	92 30 59	2046	94 23 21	2052	96 15 35	2058
	α Aquilæ W.	51 29 27	2847	53 2 54	2811	54 37 8	2781	56 12 1	2754
	α Arietis E.	47 37 11	2075	45 45 34	2083	43 54 9	2092	42 2 57	2102
	Aldebaran E.	80 29 38	2060	78 37 37	2064	76 45 43	2070	74 53 58	2076
19	SATURN W.	105 34 4	2098	107 25 7	2107	109 15 55	2118	111 6 27	2130
	α Aquilæ W.	64 13 33	2675	65 50 46	2667	67 28 10	2665	69 5 40	2660
	α Arietis E.	32 51 31	2175	31 2 26	2195	29 13 51	2218	27 25 50	2244
	Aldebaran E.	65 38 1	2120	63 47 32	2131	61 57 20	2143	60 7 26	2155
	Pollux E.	107 31 55	2139	105 41 56	2149	103 52 11	2158	102 2 40	2169
20	α Aquilæ W.	77 13 12	2675	78 50 25	2684	80 27 27	2692	82 4 17	2704
	Fomalhaut W.	51 44 27	2952	53 15 40	2930	54 47 21	2912	56 19 24	2899
	Aldebaran E.	51 3 4	2230	49 15 21	2247	47 28 4	2265	45 41 13	2284
	Pollux E.	92 59 20	2231	91 11 38	2245	89 24 17	2260	87 37 18	2274

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
21	α Aquilæ W.	83 40 52	2716	85 17 11	2729	86 53 12	2744	88 28 53	2760
	Fomalhaut W.	57 51 44	2888	59 24 18	2880	60 57 2	2876	62 20 52	2873
	α Pegasi W.	35 55 13	2649	37 33 2	2632	39 11 13	2621	40 49 39	2614
	Aldebaran E.	43 54 50	2304	42 8 56	2324	40 23 32	2346	38 38 40	2369
	Pollux E.	85 50 41	2290	84 4 27	2307	82 18 38	2324	80 33 13	2342
22	α Aquilæ W.	96 21 41	2855	97 54 57	2877	99 27 45	2901	101 0 3	2924
	Fomalhaut W.	70 14 0	2889	71 46 33	2898	73 18 55	2907	74 51 5	2917
	α Pegasi W.	49 3 6	2616	50 41 39	2622	52 20 4	2630	53 58 18	2639
	Pollux E.	71 52 37	2433	70 9 50	2453	68 27 31	2472	66 45 39	2493
	Regulus E.	108 40 52	2391	106 57 5	2410	105 13 44	2428	103 30 49	2445
23	Fomalhaut W.	82 28 12	2984	83 58 45	3000	85 28 58	3016	86 58 51	3034
	α Pegasi W.	62 6 1	2698	63 42 44	2710	65 19 10	2725	66 55 17	2738
	Pollux E.	58 23 29	2597	56 44 30	2618	55 6 0	2640	53 28 0	2663
	Regulus E.	95 2 39	2538	93 22 18	2556	91 42 23	2574	90 2 53	2593
	SUN E.	126 48 57	2877	125 16 9	2896	123 43 45	2915	122 11 45	2935
24	Fomalhaut W.	94 22 45	3126	95 50 23	3147	97 17 36	3168	98 44 24	3188
	α Pegasi W.	74 51 4	2814	76 25 14	2830	77 59 3	2845	79 32 32	2860
	α Arietis W.	31 16 19	2758	32 51 42	2769	34 26 51	2779	36 1 46	2791
	Pollux E.	45 25 30	2777	43 50 32	2801	42 16 6	2826	40 42 12	2852
	Regulus E.	81 51 39	2684	80 14 37	2701	78 37 59	2719	77 1 44	2736
	SUN E.	114 37 47	3029	113 8 10	3047	111 38 56	3065	110 10 4	3083
25	α Pegasi W.	87 15 3	2937	88 46 35	2952	90 17 48	2966	91 48 43	2981
	α Arietis W.	43 52 33	2851	45 25 55	2863	46 59 1	2876	48 31 51	2887
	Regulus E.	69 6 3	2818	67 31 58	2834	65 58 14	2849	64 24 50	2864
	SUN E.	102 51 7	3169	101 24 21	3186	99 57 55	3202	98 31 48	3218
26	α Arietis W.	56 12 13	2946	57 43 34	2957	59 14 41	2967	60 45 35	2977
	Aldebaran W.	23 47 29	3096	25 15 44	3087	26 44 9	3082	28 12 41	3078
	Regulus E.	56 42 28	2934	55 10 52	2946	53 39 32	2959	52 8 28	2972
	SUN E.	91 25 39	3288	90 1 14	3302	88 37 5	3314	87 13 10	3327
27	α Arietis W.	68 17 3	3023	69 46 47	3030	71 16 22	3039	72 45 47	3045
	Aldebaran W.	35 35 40	3082	37 4 11	3085	38 32 39	3087	40 1 4	3091
	Regulus E.	44 36 52	3028	43 7 14	3039	41 37 49	3049	40 8 37	3059
	SUN E.	80 16 58	3381	78 54 20	3391	77 31 53	3400	76 9 36	3408
28	α Arietis W.	80 10 53	3075	81 39 33	3080	83 8 7	3084	84 36 36	3087
	Aldebaran W.	47 22 14	3105	48 50 18	3107	50 18 19	3109	51 46 18	3111
	Regulus E.	32 45 39	3109	31 17 40	3119	29 49 53	3129	28 22 19	3140
	SUN E.	69 20 22	3443	67 58 54	3448	66 37 32	3454	65 16 16	3459
29	α Arietis W.	91 58 1	3101	93 26 9	3103	94 54 15	3104	96 22 20	3105
	Aldebaran W.	59 5 41	3117	60 33 30	3117	62 1 19	3117	63 29 8	3117
	SUN E.	58 31 9	3476	57 10 18	3479	55 49 30	3480	54 28 44	3482
30	Aldebaran W.	70 48 24	3111	72 16 20	3109	73 44 19	3106	75 12 21	3104
	Pollux W.	29 38 41	3296	31 2 57	3277	32 27 35	3259	33 52 34	3243
	SUN E.	47 45 13	3485	46 24 32	3484	45 3 50	3484	43 43 8	3483

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
21	α Aquilæ W.	90 4 14	2777	91 39 12	2795	93 13 47	2814	94 47 57	2834
	Fomalhaut W.	64 2 46	2873	65 35 40	2874	67 8 32	2878	68 41 19	2883
	α Pegasi W.	42 28 15	2610	44 6 57	2607	45 45 42	2608	47 24 26	2611
	Aldebaran E.	36 54 21	2394	35 10 37	2419	33 27 30	2446	31 45 1	2475
	Pollux E.	78 48 14	2359	77 3 40	2377	75 19 32	2396	73 35 51	2415
22	α Aquilæ W.	102 31 51	2950	104 3 7	2976	105 33 50	3003	107 3 59	3031
	Fomalhaut W.	76 23 2	2928	77 54 45	2942	79 26 11	2955	80 57 20	2969
	α Pegasi W.	55 36 20	2649	57 14 8	2660	58 51 42	2672	60 29 0	2684
	Pollux E.	65 4 16	2513	63 23 21	2534	61 42 55	2554	60 2 57	2576
	Regulus E.	101 48 19	2464	100 6 15	2482	98 24 37	2501	96 43 25	2520
23	Fomalhaut W.	88 28 22	3051	89 57 32	3069	91 26 19	3087	92 54 44	3107
	α Pegasi W.	68 31 6	2753	70 6 35	2768	71 41 45	2784	73 16 34	2798
	Pollux E.	51 50 30	2684	50 13 29	2707	48 36 59	2730	47 0 59	2753
	Regulus E.	88 23 49	2612	86 45 10	2629	85 6 55	2648	83 29 5	2666
	Sun E.	120 40 10	2954	119 8 59	2972	117 38 11	2991	116 7 47	3010
24	Fomalhaut W.	100 10 47	3210	101 36 44	3231	103 2 16	3254	104 27 21	3277
	α Pegasi W.	81 5 42	2876	82 38 32	2891	84 11 2	2907	85 43 12	2922
	α Arietis W.	37 36 26	2802	39 10 51	2814	40 45 1	2826	42 18 55	2838
	Pollux E.	39 8 51	2878	37 36 4	2905	36 3 51	2933	34 32 14	2962
	Regulus E.	75 25 52	2753	73 50 22	2769	72 15 14	2786	70 40 28	2802
	Sun E.	108 41 34	3101	107 13 26	3119	105 45 39	3136	104 18 13	3153
25	α Pegasi W.	93 19 19	2996	94 49 37	3010	96 19 37	3024	97 49 20	3038
	α Arietis W.	50 4 26	2900	51 36 45	2912	53 8 49	2924	54 40 38	2935
	Regulus E.	62 51 45	2879	61 18 59	2893	59 46 31	2907	58 14 21	2920
	Sun E.	97 6 0	3232	95 40 29	3247	94 15 16	3261	92 50 19	3276
26	α Arietis W.	62 16 16	2987	63 46 45	2997	65 17 2	3005	66 47 8	3014
	Aldebaran W.	29 41 17	3078	31 9 54	3078	32 38 31	3079	34 7 6	3080
	Regulus E.	50 37 40	2984	49 7 7	2995	47 36 48	3006	46 6 43	3018
	Sun E.	85 49 30	3338	84 26 3	3350	83 2 49	3360	81 39 47	3372
27	α Arietis W.	74 15 4	3052	75 44 12	3058	77 13 13	3065	78 42 6	3069
	Aldebaran W.	41 29 25	3094	42 57 42	3096	44 25 56	3099	45 54 7	3102
	Regulus E.	38 39 37	3069	37 10 49	3079	35 42 14	3088	34 13 50	3099
	Sun E.	74 47 28	3415	73 25 29	3423	72 3 39	3431	70 41 57	3437
28	α Arietis W.	86 5 1	3091	87 33 21	3094	89 1 38	3097	90 29 51	3100
	Aldebaran W.	53 14 14	3113	54 42 8	3114	56 10 0	3115	57 37 51	3116
	Regulus E.	26 54 58	3152	25 27 51	3166	24 1 1	3180	22 34 28	3197
	Sun E.	63 55 6	3463	62 34 1	3467	61 13 0	3471	59 52 3	3475
29	α Arietis W.	97 50 23	3105	99 18 26	3105	100 46 29	3105	102 14 32	3105
	Aldebaran W.	64 56 57	3116	66 24 47	3115	67 52 38	3114	69 20 30	3113
	Sun E.	53 8 0	3483	51 47 17	3484	50 26 35	3485	49 5 54	3485
30	Aldebaran W.	76 40 26	3101	78 8 35	3098	79 36 47	3095	81 5 3	3091
	Pollux W.	35 17 52	3229	36 43 27	3215	38 9 18	3204	39 35 23	3191
	Sun E.	42 22 25	3482	41 1 41	3480	39 40 55	3480	38 20 8	3479

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
SUN.	1	12 29 39.39	9.058	S. 3 12 15.5	-58.27	16 1.37	64.37	10 19.23	0.796
Mon.	2	12 33 16.94	9.071	3 35 33.0	58.18	16 1.64	64.41	10 38.18	0.783
Tues.	3	12 36 54.82	9.085	3 58 48.0	58.07	16 1.91	64.46	10 56.81	0.769
Wed.	4	12 40 33.03	9.099	4 22 0.3	-57.95	16 2.19	64.51	11 15.10	0.755
Thur.	5	12 44 11.59	9.114	4 45 9.4	57.81	16 2.47	64.56	11 33.04	0.740
Frid.	6	12 47 50.52	9.130	5 8 14.9	57.65	16 2.75	64.62	11 50.61	0.724
Sat.	7	12 51 29.84	9.147	5 31 16.5	-57.48	16 3.03	64.68	12 7.80	0.708
SUN.	8	12 55 9.56	9.164	5 54 13.8	57.29	16 3.31	64.74	12 24.59	0.691
Mon.	9	12 58 49.70	9.182	6 17 6.4	57.09	16 3.60	64.80	12 40.96	0.673
Tues.	10	13 2 30.28	9.200	6 39 54.0	-56.87	16 3.88	64.87	12 56.89	0.654
Wed.	11	13 6 11.30	9.219	7 2 36.1	56.63	16 4.16	64.94	13 12.37	0.635
Thur.	12	13 9 52.80	9.239	7 25 12.4	56.38	16 4.45	65.01	13 27.38	0.615
Frid.	13	13 13 34.79	9.260	7 47 42.5	-56.12	16 4.73	65.09	13 41.92	0.595
Sat.	14	13 17 17.28	9.282	8 10 6.1	55.84	16 5.01	65.17	13 55.93	0.574
SUN.	15	13 21 0.30	9.304	8 32 22.7	55.54	16 5.29	65.25	14 9.43	0.551
Mon.	16	13 24 43.88	9.327	8 54 32.1	-55.23	16 5.57	65.33	14 22.38	0.528
Tues.	17	13 28 28.01	9.351	9 16 33.9	54.91	16 5.84	65.42	14 34.76	0.504
Wed.	18	13 32 12.74	9.376	9 38 27.6	54.57	16 6.12	65.51	14 46.55	0.479
Thur.	19	13 35 58.08	9.402	10 0 13.0	-54.21	16 6.39	65.60	14 57.74	0.453
Frid.	20	13 39 44.04	9.429	10 21 49.7	53.84	16 6.66	65.69	15 8.30	0.426
Sat.	21	13 43 30.66	9.456	10 43 17.2	53.45	16 6.93	65.78	15 18.21	0.399
SUN.	22	13 47 17.94	9.485	11 4 35.3	-53.05	16 7.20	65.88	15 27.45	0.371
Mon.	23	13 51 5.92	9.514	11 25 43.4	52.63	16 7.46	65.98	15 36.01	0.342
Tues.	24	13 54 54.60	9.544	11 46 41.4	52.19	16 7.72	66.08	15 43.86	0.312
Wed.	25	13 58 44.01	9.574	12 7 28.7	-51.74	16 7.97	66.18	15 50.98	0.282
Thur.	26	14 2 34.15	9.605	12 28 4.8	51.27	16 8.23	66.28	15 57.38	0.251
Frid.	27	14 6 25.05	9.637	12 48 29.6	50.78	16 8.48	66.39	16 3.02	0.219
Sat.	28	14 10 16.72	9.669	13 8 42.4	-50.28	16 8.74	66.50	16 7.89	0.187
SUN.	29	14 14 9.16	9.702	13 28 43.0	49.76	16 8.99	66.61	16 11.99	0.154
Mon.	30	14 18 2.40	9.735	13 48 30.9	49.22	16 9.24	66.72	16 15.30	0.121
Tues.	31	14 21 56.42	9.768	14 8 5.6	48.66	16 9.49	66.83	16 17.82	0.088
Wed.	32	14 25 51.26	9.802	S. 14 27 26.8	-48.09	16 9.74	66.94	16 19.54	0.055

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sideral time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
<i>SUN.</i>	1	12 29 40.95	9.061	S. 3 12 25.6	-58.28	10 19.37	0.796	12 40 0.32
Mon.	2	12 33 18.55	9.074	3 35 43.3	58.19	10 38.32	0.783	12 43 56.87
Tues.	3	12 36 56.47	9.087	3 58 58.6	58.08	10 56.95	0.769	12 47 53.42
Wed.	4	12 40 34.74	9.101	4 22 11.1	-57.96	11 15.24	0.755	12 51 49.98
Thur.	5	12 44 13.35	9.116	4 45 20.5	57.82	11 33.18	0.740	12 55 46.53
Frid.	6	12 47 52.33	9.132	5 8 26.3	57.66	11 50.75	0.724	12 59 43.08
Sat.	7	12 51 31.69	9.149	5 31 28.1	-57.49	12 7.94	0.708	13 3 39.63
<i>SUN.</i>	8	12 55 11.46	9.166	5 54 25.7	57.30	12 24.73	0.691	13 7 36.19
Mon.	9	12 58 51.64	9.183	6 17 18.5	57.10	12 41.10	0.673	13 11 32.74
Tues.	10	13 2 32.26	9.202	6 40 6.3	-56.88	12 57.03	0.654	13 15 29.29
Wed.	11	13 6 13.33	9.221	7 2 48.6	56.64	13 12.51	0.635	13 19 25.85
Thur.	12	13 9 54.88	9.241	7 25 25.0	56.39	13 27.52	0.615	13 23 22.40
Frid.	13	13 13 36.90	9.262	7 47 55.3	-56.13	13 42.05	0.595	13 27 18.95
Sat.	14	13 17 19.44	9.284	8 10 19.0	55.85	13 56.06	0.573	13 31 15.50
<i>SUN.</i>	15	13 21 2.50	9.306	8 32 35.8	55.55	14 9.56	0.551	13 35 12.06
Mon.	16	13 24 46.11	9.329	8 54 45.4	-55.24	14 22.50	0.527	13 39 8.61
Tues.	17	13 28 30.29	9.353	9 16 47.2	54.91	14 34.88	0.503	13 43 5.17
Wed.	18	13 32 15.05	9.378	9 38 41.1	54.57	14 46.67	0.478	13 47 1.72
Thur.	19	13 36 0.42	9.404	10 0 26.6	-54.21	14 57.85	0.453	13 50 58.27
Frid.	20	13 39 46.42	9.431	10 22 3.3	53.84	15 8.40	0.426	13 54 54.83
Sat.	21	13 43 33.07	9.458	10 43 30.9	53.45	15 18.31	0.399	13 58 51.38
<i>SUN.</i>	22	13 47 20.39	9.486	11 4 48.9	-53.05	15 27.54	0.371	14 2 47.93
Mon.	23	13 51 8.39	9.515	11 25 57.1	52.63	15 36.09	0.342	14 6 44.49
Tues.	24	13 54 57.10	9.545	11 46 55.0	52.19	15 43.94	0.312	14 10 41.04
Wed.	25	13 58 46.54	9.575	12 7 42.3	-51.74	15 51.06	0.281	14 14 37.60
Thur.	26	14 2 36.71	9.606	12 28 18.5	51.27	15 57.44	0.250	14 18 34.15
Frid.	27	14 6 27.63	9.638	12 48 43.1	50.78	16 3.07	0.219	14 22 30.70
Sat.	28	14 10 19.32	9.670	13 8 55.9	-50.28	16 7.94	0.187	14 26 27.26
<i>SUN.</i>	29	14 14 11.78	9.702	13 28 56.4	49.76	16 12.03	0.154	14 30 23.81
Mon.	30	14 18 5.03	9.735	13 48 44.2	49.22	16 15.33	0.121	14 34 20.37
Tues.	31	14 21 59.08	9.769	14 8 18.8	48.66	16 17.84	0.088	14 38 16.92
Wed.	32	14 25 53.93	9.802	S. 14 27 39.8	-48.09	16 19.55	0.054	14 42 13.48

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,  
+ 9<sup>h</sup>.8565.  
(Table III.)



AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	274	188 5 10.0	4 15.4	147.68	— 0.71	0.0002867	—51.4	h m s 11 18 8.28
2	275	189 4 15.4	3 20.7	147.77	0.73	0.0001631	51.7	11 14 12.38
3	276	190 3 23.1	2 28.3	147.86	0.73	0.0000387	52.0	11 10 16.47
4	277	191 2 32.9	1 38.0	147.95	— 0.71	9.9999136	—52.3	11 6 20.56
5	278	192 1 44.6	0 49.6	148.03	0.65	9.9997880	52.5	11 2 24.66
6	279	193 0 58.4	0 3.3	148.12	0.56	9.9996618	52.7	10 58 28.75
7	280	193 60 14.2	59 19.0	148.20	— 0.45	9.9995349	—52.9	10 54 32.84
8	281	194 59 31.8	58 36.5	148.28	0.33	9.9994078	53.1	10 50 36.93
9	282	195 58 51.3	57 55.9	148.35	0.20	9.9992802	53.2	10 46 41.03
10	283	196 58 12.6	57 17.1	148.43	— 0.06	9.9991526	—53.2	10 42 45.12
11	284	197 57 35.6	56 40.0	148.50	+ 0.07	9.9990249	53.1	10 38 49.21
12	285	198 57 0.4	56 4.7	148.57	0.19	9.9988973	53.0	10 34 53.31
13	286	199 56 26.9	55 31.1	148.64	+ 0.28	9.9987701	—52.8	10 30 57.40
14	287	200 55 55.3	54 59.4	148.71	0.37	9.9986434	52.6	10 27 1.49
15	288	201 55 25.5	54 29.5	148.79	0.42	9.9985174	52.3	10 23 5.58
16	289	202 54 57.4	54 1.3	148.87	+ 0.45	9.9983922	—52.0	10 19 9.68
17	290	203 54 31.2	53 35.0	148.95	0.43	9.9982677	51.6	10 15 13.77
18	291	204 54 7.0	53 10.7	149.03	0.40	9.9981444	51.2	10 11 17.86
19	292	205 53 44.6	52 48.2	149.11	+ 0.34	9.9980220	—50.7	10 7 21.95
20	293	206 53 24.3	52 27.8	149.19	0.25	9.9979009	50.2	10 3 26.04
21	294	207 53 6.0	52 9.4	149.28	0.14	9.9977810	49.8	9 59 30.14
22	295	208 52 49.9	51 53.2	149.37	+ 0.03	9.9976620	—49.3	9 55 34.23
23	296	209 52 35.9	51 39.0	149.46	— 0.10	9.9975442	48.9	9 51 38.32
24	297	210 52 24.1	51 27.1	149.55	0.24	9.9974275	48.4	9 47 42.41
25	298	211 52 14.6	51 17.5	149.65	— 0.37	9.9973118	—48.0	9 43 46.51
26	299	212 52 7.2	52 10.0	149.74	0.48	9.9971971	47.7	9 39 50.60
27	300	213 52 2.1	51 4.8	149.83	0.56	9.9970830	47.4	9 35 54.69
28	301	214 51 59.2	51 1.8	149.93	— 0.63	9.9969697	—47.1	9 31 58.78
29	302	215 51 58.5	51 0.9	150.02	0.66	9.9968572	46.8	9 28 2.87
30	303	216 52 0.0	51 2.3	150.11	0.67	9.9967451	46.6	9 24 6.96
31	304	217 52 3.6	51 5.8	150.19	0.65	9.9966334	46.4	9 20 11.06
32	305	218 52 9.3	51 11.4	150.27	— 0.59	9.9965223	—46.2	9 16 15.15
NOTE—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296, (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.									
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	14 46.8	14 48.1	54 7.7	+0.31	54 12.3	+0.45	h m 22 3.7	m 1.72	d 26.4
2	14 49.7	14 51.8	54 18.5	0.58	54 26.2	0.69	22 45.1	1.74	27.4
3	14 54.2	14 56.9	54 35.1	0.79	54 45.1	0.88	23 27.5	1.80	28.4
4	14 59.9	15 3.1	54 56.0	+0.95	55 7.8	+1.01	6		29.4
5	15 6.5	15 10.1	55 20.3	1.07	55 33.5	1.12	0 11.6	1.89	0.7
6	15 13.8	15 17.7	55 47.1	1.16	56 1.3	1.20	0 58.1	2.00	1.7
7	15 21.6	15 25.7	56 15.8	+1.23	56 30.8	+1.27	1 47.6	2.13	2.7
8	15 29.9	15 34.2	56 46.2	1.30	57 1.9	1.32	2 40.1	2.24	3.7
9	15 38.6	15 43.0	57 18.0	1.35	57 34.3	1.37	3 35.1	2.33	4.7
10	15 47.5	15 52.2	57 50.8	+1.38	58 7.5	+1.39	4 31.7	2.37	5.7
11	15 56.6	16 1.1	58 24.2	1.38	58 40.7	1.36	5 28.6	2.36	6.7
12	16 5.5	16 9.7	58 56.8	1.32	59 12.2	1.25	6 24.7	2.31	7.7
13	16 13.6	16 17.2	59 26.7	+1.15	59 39.9	+1.03	7 19.3	2.24	8.7
14	16 20.3	16 22.9	59 51.4	0.87	60 0.8	0.68	8 12.5	2.19	9.7
15	16 24.8	16 26.0	60 7.8	+0.47	60 12.0	+0.22	9 4.6	2.16	10.7
16	16 26.3	16 25.7	60 13.1	-0.04	60 11.0	-0.32	9 56.5	2.17	11.7
17	16 24.2	16 21.7	60 5.4	0.60	59 56.4	0.89	10 48.8	2.20	12.7
18	16 18.4	16 14.2	59 44.2	1.15	59 28.8	1.40	11 42.3	2.26	13.7
19	16 9.2	16 3.7	59 10.6	-1.61	58 50.1	-1.79	12 37.1	2.31	14.7
20	15 57.6	15 51.1	58 27.7	1.93	58 3.9	2.02	13 32.8	2.33	15.7
21	15 44.4	15 37.6	57 39.3	2.06	57 14.4	2.07	14 28.5	2.31	16.7
22	15 30.9	15 24.3	56 49.7	-2.03	56 25.7	-1.95	15 23.1	2.24	17.7
23	15 18.1	15 12.3	56 2.8	1.85	55 41.4	1.71	16 15.5	2.13	18.7
24	15 6.9	15 2.2	55 21.8	1.55	55 4.3	1.36	17 5.1	2.01	19.7
25	14 58.0	14 54.6	54 49.1	-1.17	54 36.3	-0.97	17 51.8	1.89	20.7
26	14 51.8	14 49.7	54 26.1	0.75	54 18.4	0.53	18 36.1	1.80	21.7
27	14 48.3	14 47.7	54 13.4	-0.31	54 11.0	-0.10	19 18.4	1.74	22.7
28	14 47.7	14 48.4	54 11.1	+0.11	54 13.7	+0.31	19 59.8	1.71	23.7
29	14 49.7	14 51.7	54 18.6	0.50	54 25.7	0.67	20 41.0	1.73	24.7
30	14 54.1	14 57.1	54 34.7	0.83	54 45.6	0.97	21 23.0	1.78	25.7
31	15 0.5	15 4.2	54 58.0	1.09	55 11.7	1.18	22 6.6	1.86	26.7
32	15 8.2	15 12.4	55 26.4	+1.26	55 42.0	+1.32	22 52.7	1.98	27.7

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 1.					TUESDAY 3.				
0	10 6 50.48	1.8402	N. 6 39 30.8	11.332	0	11 35 5.32	1.8368	S. 2 45 47.4	11.936
1	10 8 40.86	1.8393	6 28 8.8	11.381	1	11 36 56.78	1.8386	2 57 43.4	11.930
2	10 10 31.19	1.8385	6 16 45.1	11.408	2	11 38 48.35	1.8603	3 9 39.0	11.923
3	10 12 21.48	1.8377	6 5 19.8	11.435	3	11 40 40.01	1.8619	3 21 34.2	11.917
4	10 14 11.72	1.8369	5 53 52.9	11.461	4	11 42 31.78	1.8638	3 33 29.0	11.909
5	10 16 1.91	1.8362	5 42 24.5	11.487	5	11 44 23.67	1.8657	3 45 23.3	11.900
6	10 17 52.07	1.8355	5 30 54.5	11.512	6	11 46 15.66	1.8675	3 57 17.0	11.891
7	10 19 42.20	1.8352	5 19 23.1	11.535	7	11 48 7.77	1.8695	4 9 10.2	11.882
8	10 21 32.29	1.8346	5 7 50.3	11.558	8	11 50 0.00	1.8715	4 21 2.8	11.871
9	10 23 22.35	1.8342	4 56 16.1	11.582	9	11 51 52.35	1.8735	4 32 54.7	11.859
10	10 25 12.39	1.8337	4 44 40.5	11.604	10	11 53 44.82	1.8756	4 44 45.9	11.847
11	10 27 2.40	1.8333	4 33 3.6	11.626	11	11 55 37.42	1.8777	4 56 36.3	11.833
12	10 28 52.39	1.8331	4 21 25.4	11.647	12	11 57 30.15	1.8800	5 8 25.9	11.819
13	10 30 42.37	1.8328	4 9 46.0	11.667	13	11 59 23.02	1.8822	5 20 14.6	11.804
14	10 32 32.33	1.8326	3 58 5.4	11.686	14	12 1 16.02	1.8845	5 32 2.4	11.789
15	10 34 22.28	1.8325	3 46 23.7	11.704	15	12 3 9.16	1.8868	5 43 49.3	11.772
16	10 36 12.23	1.8324	3 34 40.9	11.722	16	12 5 2.44	1.8892	5 55 35.1	11.755
17	10 38 2.17	1.8323	3 22 57.0	11.740	17	12 6 55.87	1.8917	6 7 19.9	11.737
18	10 39 52.11	1.8323	3 11 12.1	11.757	18	12 8 49.45	1.8942	6 19 3.6	11.718
19	10 41 42.05	1.8323	2 59 26.2	11.772	19	12 10 43.18	1.8968	6 30 46.1	11.698
20	10 43 31.99	1.8324	2 47 39.4	11.788	20	12 12 37.07	1.8994	6 42 27.4	11.677
21	10 45 21.94	1.8327	2 35 51.6	11.803	21	12 14 31.11	1.9021	6 54 7.4	11.656
22	10 47 11.91	1.8329	2 24 3.0	11.817	22	12 16 25.32	1.9048	7 5 46.1	11.634
23	10 49 1.89	1.8332	N. 2 12 13.5	11.831	23	12 18 19.69	1.9075	S. 7 17 23.5	11.611
MONDAY 2.					WEDNESDAY 4.				
0	10 50 51.89	1.8333	N. 2 0 23.3	11.843	0	12 20 14.22	1.9103	S. 7 28 59.4	11.587
1	10 52 41.91	1.8338	1 48 32.3	11.856	1	12 22 8.92	1.9132	7 40 33.9	11.562
2	10 54 31.95	1.8342	1 36 40.6	11.867	2	12 24 3.80	1.9161	7 52 6.8	11.536
3	10 56 22.02	1.8347	1 24 48.3	11.877	3	12 25 58.85	1.9190	8 3 38.2	11.509
4	10 58 12.11	1.8352	1 12 55.4	11.887	4	12 27 54.08	1.9220	8 15 7.9	11.482
5	11 0 2.24	1.8358	1 1 1.9	11.897	5	12 29 49.49	1.9251	8 26 36.0	11.454
6	11 1 52.41	1.8365	0 49 7.8	11.905	6	12 31 45.09	1.9282	8 38 2.4	11.424
7	11 3 42.62	1.8372	0 37 13.3	11.913	7	12 33 40.87	1.9312	8 49 26.9	11.393
8	11 5 32.87	1.8379	0 25 18.3	11.920	8	12 35 36.84	1.9344	9 0 49.6	11.362
9	11 7 23.17	1.8387	0 13 22.9	11.927	9	12 37 33.00	1.9377	9 12 10.4	11.331
10	11 9 13.52	1.8396	N. 0 1 27.1	11.932	10	12 39 29.36	1.9409	9 23 29.3	11.298
11	11 11 3.92	1.8405	S. 0 10 29.0	11.937	11	12 41 25.91	1.9442	9 34 46.2	11.265
12	11 12 54.38	1.8414	0 22 25.3	11.941	12	12 43 22.66	1.9476	9 46 1.1	11.231
13	11 14 44.89	1.8424	0 34 21.9	11.945	13	12 45 19.62	1.9510	9 57 13.9	11.195
14	11 16 35.47	1.8435	0 46 18.7	11.947	14	12 47 16.78	1.9544	10 8 24.5	11.158
15	11 18 26.11	1.8446	0 58 15.6	11.950	15	12 49 14.15	1.9579	10 19 32.9	11.121
16	11 20 16.82	1.8457	1 10 12.7	11.952	16	12 51 11.73	1.9615	10 30 39.0	11.082
17	11 22 7.60	1.8470	1 22 9.8	11.954	17	12 53 9.53	1.9651	10 41 42.8	11.043
18	11 23 58.46	1.8482	1 34 6.9	11.952	18	12 55 7.54	1.9687	10 52 44.2	11.008
19	11 25 49.39	1.8495	1 46 4.0	11.951	19	12 57 5.77	1.9723	11 3 43.1	10.968
20	11 27 40.40	1.8509	1 58 1.0	11.949	20	12 59 4.22	1.9760	11 14 39.6	10.920
21	11 29 31.50	1.8523	2 9 57.9	11.947	21	13 1 2.89	1.9797	11 25 33.5	10.877
22	11 31 22.68	1.8538	2 21 54.6	11.943	22	13 3 1.79	1.9836	11 36 24.8	10.832
23	11 33 13.96	1.8553	2 33 51.1	11.940	23	13 5 0.92	1.9874	11 47 13.4	10.787
24	11 35 5.32	1.8568	S. 2 45 47.4	11.936	24	13 7 0.28	1.9912	S. 11 57 59.3	10.742

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 5.					SATURDAY 7.				
0	13 7 0.28	1.9912	S. 11 57 59.3	10.742	0	14 47 36.87	2.2082	S. 19 21 42.9	7.352
1	13 8 59.87	1.9932	12 8 42.4	10.695	1	14 49 49.51	2.2130	19 29 1.2	7.257
2	13 10 59.70	1.9952	12 19 22.7	10.647	2	14 52 2.43	2.2177	19 36 13.7	7.160
3	13 12 59.77	2.0031	12 30 0.1	10.598	3	14 54 15.64	2.2225	19 43 20.4	7.062
4	13 15 0.07	2.0071	12 40 34.5	10.548	4	14 56 29.13	2.2272	19 50 21.2	6.965
5	13 17 0.62	2.0112	12 51 5.9	10.497	5	14 58 42.91	2.2320	19 57 16.0	6.865
6	13 19 1.41	2.0152	13 1 34.2	10.446	6	15 0 56.97	2.2367	20 4 4.8	6.762
7	13 21 2.45	2.0194	13 11 59.4	10.393	7	15 3 11.31	2.2413	20 10 47.5	6.661
8	13 23 3.74	2.0236	13 22 21.4	10.340	8	15 5 25.93	2.2460	20 17 24.1	6.558
9	13 25 5.28	2.0277	13 32 40.2	10.285	9	15 7 40.83	2.2507	20 23 54.4	6.453
10	13 27 7.07	2.0319	13 42 55.6	10.229	10	15 9 56.01	2.2553	20 30 18.5	6.348
11	13 29 9.11	2.0362	13 53 7.7	10.172	11	15 12 11.47	2.2599	20 36 36.2	6.242
12	13 31 11.41	2.0405	14 3 16.3	10.114	12	15 14 27.20	2.2645	20 42 47.5	6.135
13	13 33 13.97	2.0448	14 13 21.4	10.056	13	15 16 43.21	2.2691	20 48 52.4	6.027
14	13 35 16.79	2.0492	14 23 23.0	9.997	14	15 18 59.49	2.2736	20 54 50.8	5.919
15	13 37 19.87	2.0536	14 33 21.0	9.936	15	15 21 16.04	2.2781	21 0 42.7	5.810
16	13 39 23.22	2.0580	14 43 15.3	9.874	16	15 23 32.86	2.2826	21 6 28.0	5.699
17	13 41 26.83	2.0624	14 53 5.9	9.812	17	15 25 49.95	2.2870	21 12 6.6	5.587
18	13 43 30.71	2.0669	15 2 52.7	9.747	18	15 28 7.30	2.2914	21 17 38.5	5.475
19	13 45 34.86	2.0713	15 12 35.6	9.682	19	15 30 24.92	2.2957	21 23 3.6	5.362
20	13 47 39.27	2.0758	15 22 14.6	9.617	20	15 32 42.79	2.3001	21 28 21.9	5.247
21	13 49 43.96	2.0804	15 31 49.6	9.549	21	15 35 0.93	2.3044	21 33 33.3	5.132
22	13 51 48.92	2.0849	15 41 20.5	9.481	22	15 37 19.32	2.3087	21 38 37.7	5.016
23	13 53 54.15	2.0895	S. 15 50 47.3	9.412	23	15 39 37.97	2.3129	S. 21 43 35.2	4.900
FRIDAY 6.					SUNDAY 8.				
0	13 55 59.66	2.0942	S. 16 0 10.0	9.342	0	15 41 56.87	2.3171	S. 21 48 25.7	4.782
1	13 58 5.45	2.0987	16 9 28.4	9.272	1	15 44 16.02	2.3212	21 53 9.0	4.665
2	14 0 11.51	2.1033	16 18 42.6	9.200	2	15 46 35.42	2.3253	21 57 45.2	4.543
3	14 2 17.85	2.1080	16 27 52.4	9.127	3	15 48 55.06	2.3293	22 2 14.2	4.423
4	14 4 24.47	2.1127	16 36 57.8	9.052	4	15 51 14.94	2.3333	22 6 36.0	4.302
5	14 6 31.37	2.1174	16 45 58.7	8.977	5	15 53 35.06	2.3373	22 10 50.5	4.180
6	14 8 38.56	2.1222	16 54 55.1	8.902	6	15 55 55.42	2.3412	22 14 57.6	4.057
7	14 10 46.03	2.1269	17 3 46.9	8.824	7	15 58 16.01	2.3450	22 18 57.3	3.933
8	14 12 53.79	2.1317	17 12 34.0	8.746	8	16 0 36.82	2.3488	22 22 49.6	3.809
9	14 15 1.83	2.1363	17 21 16.4	8.667	9	16 2 57.86	2.3526	22 26 34.4	3.683
10	14 17 10.15	2.1411	17 29 54.0	8.587	10	16 5 19.13	2.3562	22 30 11.6	3.558
11	14 19 18.76	2.1459	17 38 26.8	8.505	11	16 7 40.61	2.3597	22 33 41.3	3.432
12	14 21 27.66	2.1507	17 46 54.6	8.422	12	16 10 2.30	2.3633	22 37 3.4	3.304
13	14 23 36.84	2.1554	17 55 17.5	8.339	13	16 12 24.21	2.3669	22 40 17.8	3.176
14	14 25 46.31	2.1602	18 3 35.3	8.254	14	16 14 46.33	2.3704	22 43 24.5	3.047
15	14 27 56.07	2.1651	18 11 48.0	8.169	15	16 17 8.66	2.3737	22 46 23.4	2.917
16	14 30 6.12	2.1699	18 19 55.6	8.082	16	16 19 31.18	2.3770	22 49 14.5	2.787
17	14 32 16.46	2.1747	18 27 57.9	7.995	17	16 21 53.90	2.3803	22 51 57.8	2.657
18	14 34 27.09	2.1795	18 35 55.0	7.907	18	16 24 16.82	2.3836	22 54 33.3	2.525
19	14 36 38.00	2.1842	18 43 46.7	7.817	19	16 26 39.93	2.3867	22 57 0.8	2.392
20	14 38 49.20	2.1891	18 51 33.0	7.727	20	16 29 3.22	2.3897	22 59 20.4	2.260
21	14 41 0.69	2.1938	18 59 13.9	7.635	21	16 31 26.69	2.3927	23 1 32.0	2.126
22	14 43 12.46	2.1986	19 6 49.2	7.542	22	16 33 50.34	2.3956	23 3 35.5	1.992
23	14 45 24.52	2.2034	19 14 18.9	7.447	23	16 36 14.16	2.3983	23 5 31.0	1.858
24	14 47 36.87	2.2082	S. 19 21 42.9	7.352	24	16 38 38.14	2.4011	S. 23 7 18.5	1.723

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 9.					WEDNESDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	16 38 38.14	2.4011	S. 23 7 18.5	1.723	1	18 35 35.38	2.4413	S. 21 48 30.0	5.032
2	16 41 2.29	2.4038	23 8 57.8	1.587	2	18 38 1.83	2.4403	21 43 23.9	5.171
3	16 43 26.60	2.4065	23 10 29.0	1.452	3	18 40 28.22	2.4392	21 38 9.5	5.309
4	16 45 51.07	2.4091	23 11 52.0	1.315	4	18 42 54.54	2.4381	21 32 46.8	5.447
5	16 48 15.69	2.4115	23 13 6.8	1.177	5	18 45 20.79	2.4369	21 27 15.9	5.583
6	16 50 40.45	2.4139	23 14 13.3	1.040	6	18 47 46.97	2.4357	21 21 36.8	5.719
7	16 53 5.36	2.4162	23 15 11.6	0.902	7	18 50 13.07	2.4343	21 15 49.6	5.855
8	16 55 30.40	2.4185	23 16 1.6	0.764	8	18 52 39.09	2.4329	21 9 54.2	5.991
9	16 57 55.58	2.4207	23 16 43.3	0.625	9	18 55 5.02	2.4315	21 3 50.7	6.126
10	17 0 20.88	2.4227	23 17 16.6	0.485	10	18 57 30.87	2.4300	20 57 39.1	6.260
11	17 2 46.31	2.4247	23 17 41.5	0.346	11	18 59 56.62	2.4284	20 51 19.5	6.393
12	17 5 11.85	2.4266	23 17 58.1	0.207	12	19 2 22.28	2.4268	20 44 51.9	6.526
13	17 7 37.50	2.4284	23 18 6.3	-0.067	13	19 4 47.84	2.4252	20 38 16.4	6.658
14	17 10 3.26	2.4302	23 18 6.1	+0.074	14	19 7 13.30	2.4234	20 31 32.9	6.791
15	17 12 29.13	2.4320	23 17 57.4	0.215	15	19 9 38.65	2.4217	20 24 41.5	6.922
16	17 14 55.10	2.4336	23 17 40.3	0.356	16	19 12 3.90	2.4199	20 17 42.3	7.052
17	17 17 21.16	2.4351	23 17 14.7	0.497	17	19 14 29.04	2.4181	20 10 35.3	7.182
18	17 19 47.31	2.4365	23 16 40.6	0.639	18	19 16 54.07	2.4162	20 3 20.5	7.311
19	17 22 13.54	2.4378	23 15 58.0	0.781	19	19 19 18.98	2.4142	19 55 58.0	7.439
20	17 24 39.85	2.4392	23 15 6.9	0.922	20	19 21 43.77	2.4122	19 48 27.8	7.567
21	17 27 6.24	2.4403	23 14 7.3	1.065	21	19 24 8.44	2.4102	19 40 50.0	7.693
22	17 29 32.69	2.4414	23 12 59.1	1.207	22	19 26 32.99	2.4082	19 33 4.6	7.819
23	17 31 59.21	2.4425	23 11 42.4	1.350	23	19 28 57.42	2.4061	19 25 11.7	7.944
24	17 34 25.79	2.4434	S. 23 10 17.1	1.492	24	19 31 21.72	2.4040	S. 19 17 11.3	8.069
TUESDAY 10.					THURSDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	17 36 52.42	2.4442	S. 23 8 43.3	1.635	1	19 33 45.90	2.4018	S. 19 9 3.4	8.192
2	17 39 19.10	2.4450	23 7 0.9	1.778	2	19 36 9.94	2.3996	19 0 48.2	8.313
3	17 41 45.82	2.4457	23 5 9.9	1.921	3	19 38 33.85	2.3974	18 52 25.6	8.437
4	17 44 12.59	2.4464	23 3 10.4	2.063	4	19 40 57.63	2.3952	18 43 55.7	8.558
5	17 46 39.39	2.4469	23 1 2.3	2.207	5	19 43 21.28	2.3930	18 35 18.6	8.678
6	17 49 6.22	2.4474	22 58 45.6	2.349	6	19 45 44.79	2.3906	18 26 34.3	8.797
7	17 51 33.08	2.4477	22 56 20.4	2.492	7	19 48 8.15	2.3883	18 17 42.9	8.916
8	17 53 59.95	2.4480	22 53 46.6	2.635	8	19 50 31.38	2.3860	18 8 44.4	9.033
9	17 56 26.84	2.4482	22 51 4.2	2.777	9	19 52 54.47	2.3837	17 59 38.9	9.150
10	17 58 53.74	2.4483	22 48 13.3	2.920	10	19 55 17.42	2.3813	17 50 26.4	9.266
11	18 1 20.64	2.4484	22 45 13.8	3.062	11	19 57 40.23	2.3789	17 41 7.0	9.380
12	18 3 47.55	2.4485	22 42 5.8	3.204	12	20 0 2.89	2.3765	17 31 40.8	9.493
13	18 6 14.46	2.4483	22 38 49.3	3.347	13	20 2 25.41	2.3742	17 22 7.8	9.606
14	18 8 41.35	2.4481	22 35 24.2	3.488	14	20 4 47.79	2.3717	17 12 28.1	9.717
15	18 11 8.23	2.4479	22 31 50.7	3.630	15	20 7 10.02	2.3692	17 2 41.7	9.828
16	18 13 35.10	2.4476	22 28 8.6	3.772	16	20 9 32.10	2.3667	16 52 48.7	9.937
17	18 16 1.94	2.4472	22 24 18.0	3.913	17	20 11 54.03	2.3643	16 42 49.2	10.045
18	18 18 28.76	2.4467	22 20 19.0	4.054	18	20 14 15.82	2.3619	16 32 43.3	10.153
19	18 20 55.55	2.4462	22 16 11.5	4.196	19	20 16 37.46	2.3595	16 22 30.9	10.260
20	18 23 22.30	2.4455	22 11 55.5	4.336	20	20 18 58.96	2.3571	16 12 12.1	10.365
21	18 25 49.01	2.4448	22 7 31.2	4.476	21	20 21 20.31	2.3546	16 1 47.1	10.468
22	18 28 15.68	2.4441	22 2 58.4	4.616	22	20 23 41.51	2.3521	15 51 15.9	10.572
23	18 30 42.30	2.4432	21 58 17.3	4.755	23	20 26 2.56	2.3497	15 40 38.5	10.674
24	18 33 8.87	2.4423	21 53 27.8	4.894	24	20 28 23.47	2.3472	15 29 55.0	10.775
	18 35 35.38	2.4413	S. 21 48 30.0	5.032		20 30 44.22	2.3447	S. 15 19 5.5	10.874

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					SUNDAY 15.				
0	h m s	a	S. ° ' "	"	0	h m s	a	S. ° ' "	"
0	20 30 44.22	2.3447	S. 15 19 5.5	10.874	0	22 20 51.41	2.2563	S. 5 6 16.5	14.137
1	20 33 4.83	2.3422	15 8 10.1	10.972	1	22 23 6.76	2.2554	4 52 7.3	14.170
2	20 35 25.29	2.3398	14 57 8.8	11.070	2	22 25 22.06	2.2547	4 37 56.1	14.202
3	20 37 45.61	2.3375	14 46 1.7	11.166	3	22 27 37.32	2.2539	4 23 43.0	14.232
4	20 40 5.79	2.3351	14 34 48.9	11.261	4	22 29 52.53	2.2531	4 9 28.2	14.260
5	20 42 25.82	2.3327	14 23 30.4	11.355	5	22 32 7.69	2.2524	3 55 11.8	14.287
6	20 44 45.71	2.3302	14 12 6.3	11.447	6	22 34 22.82	2.2519	3 40 53.7	14.314
7	20 47 5.45	2.3279	14 0 36.7	11.539	7	22 36 37.92	2.2513	3 26 34.1	14.338
8	20 49 25.06	2.3256	13 49 1.6	11.629	8	22 38 52.98	2.2507	3 12 13.1	14.360
9	20 51 44.52	2.3232	13 37 21.2	11.717	9	22 41 8.01	2.2502	2 57 50.9	14.381
10	20 54 3.84	2.3208	13 25 35.5	11.806	10	22 43 23.01	2.2498	2 43 27.4	14.401
11	20 56 23.02	2.3185	13 13 44.5	11.893	11	22 45 37.99	2.2495	2 29 2.8	14.418
12	20 58 42.06	2.3162	13 1 48.4	11.977	12	22 47 52.95	2.2492	2 14 37.2	14.434
13	21 1 0.97	2.3140	12 49 47.2	12.061	13	22 50 7.89	2.2489	2 0 10.7	14.449
14	21 3 19.74	2.3117	12 37 41.1	12.143	14	22 52 22.82	2.2487	1 45 43.3	14.463
15	21 5 38.38	2.3096	12 25 30.0	12.225	15	22 54 37.73	2.2485	1 31 15.1	14.475
16	21 7 56.89	2.3074	12 13 14.1	12.305	16	22 56 52.64	2.2485	1 16 46.3	14.484
17	21 10 15.27	2.3052	12 0 53.4	12.384	17	22 59 7.55	2.2484	1 2 17.0	14.492
18	21 12 33.52	2.3031	11 48 28.0	12.462	18	23 1 22.45	2.2483	0 47 47.2	14.499
19	21 14 51.64	2.3010	11 35 58.0	12.537	19	23 3 37.35	2.2484	0 33 17.1	14.504
20	21 17 9.64	2.2989	11 23 23.5	12.612	20	23 5 52.26	2.2485	0 18 46.7	14.508
21	21 19 27.51	2.2968	11 10 44.6	12.685	21	23 8 7.17	2.2486	S. 0 4 16.1	14.511
22	21 21 45.26	2.2948	10 58 1.3	12.757	22	23 10 22.09	2.2488	N. 0 10 14.6	14.512
23	21 24 2.89	2.2928	S. 10 45 13.7	12.828	23	23 12 37.03	2.2491	N. 0 24 45.3	14.510
SATURDAY 14.					MONDAY 16.				
0	h m s	a	S. ° ' "	"	0	h m s	a	N. ° ' "	"
0	21 26 20.40	2.2909	S. 10 32 21.9	12.897	0	23 14 51.98	2.2493	N. 0 39 15.8	14.507
1	21 28 37.80	2.2890	10 19 26.0	12.966	1	23 17 6.95	2.2497	0 53 46.1	14.502
2	21 30 55.08	2.2871	10 6 26.0	13.033	2	23 19 21.95	2.2502	1 8 16.1	14.497
3	21 33 12.25	2.2852	9 53 22.1	13.097	3	23 21 36.97	2.2506	1 22 45.8	14.490
4	21 35 29.31	2.2835	9 40 14.3	13.161	4	23 23 52.02	2.2511	1 37 14.9	14.480
5	21 37 46.27	2.2817	9 27 2.8	13.223	5	23 26 7.10	2.2516	1 51 43.4	14.469
6	21 40 3.12	2.2800	9 13 47.5	13.285	6	23 28 22.21	2.2522	2 6 11.2	14.457
7	21 42 19.87	2.2783	9 0 28.6	13.345	7	23 30 37.37	2.2529	2 20 38.3	14.444
8	21 44 36.52	2.2767	8 47 6.1	13.403	8	23 32 52.56	2.2535	2 35 4.5	14.428
9	21 46 53.07	2.2750	8 33 40.2	13.460	9	23 35 7.79	2.2543	2 49 29.7	14.411
10	21 49 9.52	2.2735	8 20 10.9	13.515	10	23 37 23.07	2.2552	3 3 53.8	14.392
11	21 51 25.89	2.2720	8 6 38.4	13.568	11	23 39 38.41	2.2560	3 18 16.8	14.372
12	21 53 42.16	2.2705	7 53 2.7	13.621	12	23 41 53.79	2.2568	3 32 38.5	14.351
13	21 55 58.35	2.2691	7 39 23.9	13.672	13	23 44 9.23	2.2577	3 46 58.9	14.327
14	21 58 14.45	2.2677	7 25 42.0	13.722	14	23 46 24.72	2.2587	4 1 17.8	14.302
15	22 0 30.47	2.2663	7 11 57.2	13.771	15	23 48 40.27	2.2597	4 15 35.2	14.276
16	22 2 46.41	2.2650	6 58 9.5	13.817	16	23 50 55.89	2.2608	4 29 50.9	14.247
17	22 5 2.27	2.2637	6 44 19.1	13.862	17	23 53 11.57	2.2619	4 44 4.9	14.217
18	22 7 18.06	2.2626	6 30 26.0	13.906	18	23 55 27.32	2.2631	4 58 17.0	14.186
19	22 9 33.78	2.2614	6 16 30.4	13.948	19	23 57 43.14	2.2643	5 12 27.2	14.153
20	22 11 49.43	2.2603	6 2 32.2	13.989	20	23 59 59.03	2.2655	5 26 35.4	14.119
21	22 14 5.02	2.2592	5 48 31.7	14.028	21	0 2 15.00	2.2667	5 40 41.5	14.082
22	22 16 20.54	2.2582	5 34 28.8	14.067	22	0 4 31.04	2.2681	5 54 45.3	14.044
23	22 18 36.00	2.2572	5 20 23.7	14.103	23	0 6 47.17	2.2694	6 8 46.8	14.006
24	22 20 51.41	2.2563	S. 5 6 16.5	14.137	24	0 9 3.37	2.2707	N. 6 22 46.0	13.965

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 17.					THURSDAY 19.				
0	h m s		N. 6 22 46.0	13.965	0	h m s		N. 16 17 22.3	10.873
1	0 9 3.37	2.2707	6 36 42.6	13.922	1	2 0 9.45	2.3688	16 27 35.4	10.164
2	0 11 19.66	2.2722	6 50 36.6	13.878	2	2 2 31.28	2.3647	16 37 42.0	10.054
3	0 13 36.04	2.2737	7 4 28.0	13.833	3	2 4 53.22	2.3667	16 47 41.9	9.943
4	0 15 52.51	2.2752	7 18 16.6	13.786	4	2 7 15.28	2.3686	16 57 35.1	9.831
5	0 18 9.07	2.2767	7 32 2.3	13.737	5	2 9 37.45	2.3704	17 7 21.6	9.718
6	0 20 25.72	2.2783	7 45 45.0	13.687	6	2 11 59.73	2.3722	17 17 1.3	9.604
7	0 22 42.47	2.2800	7 59 24.7	13.635	7	2 14 22.12	2.3740	17 26 34.1	9.489
8	0 24 59.32	2.2816	8 13 1.2	13.581	8	2 16 44.61	2.3757	17 36 0.0	9.373
9	0 27 16.26	2.2832	8 26 34.4	13.526	9	2 19 7.21	2.3775	17 45 18.9	9.256
10	0 29 33.30	2.2849	8 40 4.3	13.470	10	2 21 29.91	2.3792	17 54 30.7	9.138
11	0 31 50.45	2.2867	8 53 30.8	13.412	11	2 23 52.71	2.3808	18 3 35.4	9.019
12	0 34 7.70	2.2884	9 6 53.7	13.353	12	2 26 15.61	2.3824	18 12 33.0	8.900
13	0 36 25.06	2.2902	9 20 13.1	13.292	13	2 28 38.60	2.3840	18 21 23.4	8.779
14	0 38 42.53	2.2920	9 33 28.7	13.228	14	2 31 1.69	2.3856	18 30 6.5	8.657
15	0 41 0.10	2.2938	9 46 40.5	13.164	15	2 33 24.87	2.3871	18 38 42.3	8.533
16	0 43 17.79	2.2957	9 59 48.4	13.099	16	2 35 48.14	2.3885	18 47 10.7	8.412
17	0 45 35.59	2.2977	10 12 52.4	13.032	17	2 38 11.49	2.3899	18 55 31.7	8.288
18	0 47 53.51	2.2996	10 25 52.3	12.963	18	2 40 34.93	2.3912	19 3 45.3	8.164
19	0 50 11.54	2.3015	10 38 48.0	12.893	19	2 42 58.44	2.3925	19 11 51.4	8.038
20	0 52 29.69	2.3034	10 51 39.5	12.822	20	2 45 22.03	2.3938	19 19 49.9	7.912
21	0 54 47.95	2.3053	11 4 26.7	12.750	21	2 47 45.70	2.3951	19 27 40.8	7.785
22	0 57 6.33	2.3074	11 17 9.5	12.676	22	2 50 9.44	2.3964	19 35 24.1	7.657
23	0 59 24.84	2.3094	N. 11 29 47.8	12.600	23	2 52 33.25	2.3973	N. 19 42 59.7	7.529
24	1 1 43.46	2.3113				2 54 57.12	2.3983		
WEDNESDAY 18.					FRIDAY 20.				
0	h m s		N. 11 42 21.5	12.522	0	h m s		N. 19 50 27.6	7.400
1	1 4 2.20	2.3134	11 54 50.5	12.444	1	2 57 21.05	2.3993	19 57 47.7	7.271
2	1 6 21.07	2.3155	12 7 14.8	12.364	2	2 59 45.04	2.4003	20 5 0.1	7.141
3	1 8 40.06	2.3176	12 19 34.2	12.282	3	3 2 9.09	2.4012	20 12 4.6	7.010
4	1 10 59.18	2.3197	12 31 48.7	12.199	4	3 4 33.19	2.4020	20 19 1.3	6.879
5	1 13 18.42	2.3217	12 43 58.1	12.115	5	3 6 57.33	2.4027	20 25 50.1	6.747
6	1 15 37.79	2.3238	12 56 2.5	12.030	6	3 9 21.52	2.4035	20 32 31.0	6.615
7	1 17 57.28	2.3258	13 8 1.7	11.943	7	3 11 45.75	2.4041	20 39 3.9	6.482
8	1 20 16.89	2.3279	13 19 55.7	11.855	8	3 14 10.01	2.4047	20 45 28.8	6.348
9	1 22 36.63	2.3301	13 31 44.3	11.766	9	3 16 34.31	2.4052	20 51 45.7	6.215
10	1 24 56.50	2.3322	13 43 27.6	11.675	10	3 18 58.64	2.4057	20 57 54.6	6.081
11	1 27 16.50	2.3343	13 55 5.3	11.582	11	3 21 23.00	2.4061	21 3 55.4	5.947
12	1 29 36.62	2.3363	14 6 37.5	11.489	12	3 23 47.37	2.4065	21 9 48.2	5.812
13	1 31 56.86	2.3384	14 18 4.0	11.394	13	3 26 11.75	2.4069	21 15 32.9	5.677
14	1 34 17.23	2.3406	14 29 24.8	11.299	14	3 28 36.15	2.4072	21 21 9.4	5.541
15	1 36 37.73	2.3427	14 40 39.9	11.202	15	3 31 0.56	2.4076	21 26 37.8	5.405
16	1 38 58.35	2.3447	14 51 49.0	11.103	16	3 33 24.97	2.4079	21 31 58.0	5.268
17	1 41 19.10	2.3468	15 2 52.2	11.003	17	3 35 49.39	2.4082	21 37 10.0	5.132
18	1 43 39.97	2.3488	15 13 49.4	10.902	18	3 38 13.80	2.4085	21 42 13.8	4.996
19	1 46 0.96	2.3508	15 24 40.5	10.800	19	3 40 38.20	2.4088	21 47 9.5	4.859
20	1 48 22.07	2.3529	15 35 25.4	10.697	20	3 43 2.58	2.4091	21 51 56.9	4.722
21	1 50 43.31	2.3550	15 46 4.1	10.593	21	3 45 26.95	2.4093	21 56 36.1	4.585
22	1 53 4.67	2.3569	15 56 36.5	10.488	22	3 47 51.29	2.4095	22 1 7.1	4.447
23	1 55 26.14	2.3589	16 7 2.6	10.382	23	3 50 15.61	2.4097	22 5 29.8	4.309
24	1 57 47.74	2.3609	N. 16 17 22.3	10.273	24	3 52 39.90	2.4098	N. 22 9 44.2	4.172
	2 0 9.45	2.3628				3 55 4.15	2.4098		

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 21.					MONDAY 23.				
0	h m s	s	N. 22 9 44.2	4.178	0	h m s	s	N. 22 54 9.1	2.178
1	3 55 4.15	2.4038	22 13 50.4	4.034	1	5 48 17.76	2.2874	22 51 54.8	2.298
2	3 57 28.36	2.4032	22 17 48.3	3.896	2	5 50 34.89	2.2835	22 49 33.3	2.417
3	3 59 52.53	2.4024	22 21 37.9	3.757	3	5 52 51.78	2.2795	22 47 4.7	2.536
4	4 2 16.65	2.4015	22 25 19.2	3.620	4	5 55 8.43	2.2754	22 44 29.0	2.653
5	4 4 40.71	2.4005	22 28 52.3	3.482	5	5 57 24.83	2.2713	22 41 46.3	2.771
6	4 7 4.71	2.3996	22 32 17.1	3.344	6	5 59 40.99	2.2673	22 38 56.5	2.887
7	4 9 28.66	2.3985	22 35 33.6	3.207	7	6 1 56.91	2.2632	22 35 59.8	3.003
8	4 11 52.53	2.3973	22 38 41.9	3.069	8	6 4 12.57	2.2589	22 32 56.1	3.118
9	4 14 16.33	2.3960	22 41 41.9	2.931	9	6 6 27.98	2.2547	22 29 45.6	3.232
10	4 16 40.05	2.3947	22 44 33.6	2.793	10	6 8 43.14	2.2505	22 26 28.3	3.345
11	4 19 3.69	2.3932	22 47 17.0	2.655	11	6 10 58.04	2.2462	22 23 4.2	3.457
12	4 21 27.24	2.3917	22 49 52.2	2.518	12	6 13 12.68	2.2418	22 19 33.4	3.569
13	4 23 50.70	2.3902	22 52 19.2	2.382	13	6 15 27.06	2.2375	22 15 55.9	3.681
14	4 26 14.07	2.3886	22 54 38.0	2.244	14	6 17 41.18	2.2332	22 12 11.7	3.791
15	4 28 37.33	2.3868	22 56 48.5	2.107	15	6 19 55.04	2.2287	22 8 21.0	3.900
16	4 31 0.49	2.3851	22 58 50.8	1.971	16	6 22 8.63	2.2243	22 4 23.7	4.009
17	4 33 23.54	2.3833	23 0 45.0	1.835	17	6 24 21.96	2.2199	22 0 19.9	4.117
18	4 35 46.48	2.3813	23 2 31.0	1.699	18	6 26 35.02	2.2155	21 56 9.6	4.224
19	4 38 9.30	2.3792	23 4 8.9	1.563	19	6 28 47.82	2.2110	21 51 53.0	4.330
20	4 40 31.99	2.3772	23 5 38.6	1.427	20	6 31 0.34	2.2064	21 47 30.0	4.436
21	4 42 54.56	2.3750	23 7 0.2	1.292	21	6 33 12.59	2.2019	21 43 0.7	4.540
22	4 45 16.99	2.3727	23 8 13.7	1.157	22	6 35 24.57	2.1974	21 38 25.2	4.643
23	4 47 39.29	2.3704	N. 23 9 19.1	1.022	23	6 37 36.28	2.1928	N. 21 33 43.5	4.746
24	4 50 1.44	2.3680				6 39 47.71	2.1882		
SUNDAY 22.					TUESDAY 24.				
0	4 52 23.45	2.3656	N. 23 10 16.4	0.888	0	6 41 58.87	2.1837	N. 21 28 55.7	4.848
1	4 54 45.31	2.3631	23 11 5.7	0.753	1	6 44 9.75	2.1791	21 24 1.7	4.950
2	4 57 7.02	2.3605	23 11 47.0	0.622	2	6 46 20.36	2.1745	21 19 1.7	5.050
3	4 59 28.57	2.3578	23 12 20.3	0.489	3	6 48 30.69	2.1698	21 13 55.7	5.150
4	5 1 49.96	2.3551	23 12 45.7	0.357	4	6 50 40.74	2.1652	21 8 43.7	5.249
5	5 4 11.18	2.3523	23 13 3.1	0.224	5	6 52 50.52	2.1607	21 3 25.8	5.347
6	5 6 32.23	2.3493	23 13 12.6	+ 0.093	6	6 55 0.02	2.1560	20 58 2.1	5.443
7	5 8 53.10	2.3464	23 13 14.3	- 0.037	7	6 57 9.24	2.1513	20 52 32.6	5.540
8	5 11 13.80	2.3435	23 13 8.1	0.168	8	6 59 18.18	2.1467	20 46 57.3	5.636
9	5 13 34.32	2.3404	23 12 54.1	0.298	9	7 1 26.85	2.1422	20 41 16.3	5.730
10	5 15 54.65	2.3372	23 12 32.3	0.427	10	7 3 35.24	2.1375	20 35 29.7	5.824
11	5 18 14.79	2.3341	23 12 2.8	0.557	11	7 5 43.35	2.1328	20 29 37.4	5.917
12	5 20 34.74	2.3308	23 11 25.5	0.686	12	7 7 51.18	2.1282	20 23 39.6	6.009
13	5 22 54.49	2.3275	23 10 40.5	0.813	13	7 9 58.73	2.1236	20 17 36.3	6.100
14	5 25 14.04	2.3242	23 9 47.9	0.940	14	7 12 6.01	2.1190	20 11 27.6	6.191
15	5 27 33.39	2.3207	23 8 47.7	1.067	15	7 14 13.01	2.1144	20 5 13.4	6.281
16	5 29 52.53	2.3172	23 7 39.9	1.192	16	7 16 19.74	2.1098	19 58 53.9	6.369
17	5 32 11.45	2.3136	23 6 24.6	1.318	17	7 18 26.19	2.1052	19 52 29.1	6.457
18	5 34 30.16	2.3101	23 5 1.7	1.443	18	7 20 32.36	2.1006	19 45 59.1	6.544
19	5 36 48.66	2.3065	23 3 31.4	1.567	19	7 22 38.26	2.0960	19 39 23.8	6.631
20	5 39 6.94	2.3027	23 1 53.6	1.691	20	7 24 43.88	2.0915	19 32 43.4	6.716
21	5 41 24.99	2.2989	23 0 8.5	1.813	21	7 26 49.24	2.0870	19 25 57.9	6.801
22	5 43 42.81	2.2951	22 58 16.0	1.936	22	7 28 54.32	2.0824	19 19 7.3	6.885
23	5 46 0.40	2.2912	22 56 16.2	2.057	23	7 30 59.13	2.0779	19 12 11.7	6.967
24	5 48 17.76	2.2874	N. 22 54 9.1	2.178	24	7 33 3.67	2.0734	N. 19 5 11.2	7.049



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 25.					FRIDAY 27.				
0	h m s	s	N. 19 5 11.2	7.049	0	h m s	s	N. 12 6 51.2	10.100
1	7 33 3.67	2.0734	18 58 5.8	7.131	1	9 7 57.91	1.8955	11 56 43.8	10.146
2	7 35 7.94	2.0690	18 50 55.5	7.212	2	9 9 51.56	1.8929	11 46 33.7	10.191
3	7 37 11.95	2.0646	18 43 40.4	7.292	3	9 11 45.06	1.8903	11 36 20.9	10.236
4	7 39 15.69	2.0601	18 36 20.5	7.371	4	9 13 38.40	1.8877	11 26 5.4	10.281
5	7 41 19.16	2.0557	18 28 55.9	7.448	5	9 15 31.59	1.8852	11 15 47.2	10.325
6	7 43 22.37	2.0513	18 21 26.7	7.526	6	9 17 24.63	1.8828	11 5 26.4	10.368
7	7 45 25.32	2.0469	18 13 52.8	7.602	7	9 19 17.53	1.8804	10 55 3.0	10.411
8	7 47 28.00	2.0425	17 6 14.4	7.677	8	9 21 10.28	1.8780	10 44 37.1	10.452
9	7 49 30.42	2.0382	17 58 31.5	7.752	9	9 23 2.89	1.8757	10 34 8.8	10.493
10	7 51 32.59	2.0340	17 50 44.1	7.827	10	9 24 55.37	1.8736	10 23 38.0	10.534
11	7 53 34.50	2.0297	17 42 52.2	7.901	11	9 26 47.72	1.8714	10 13 4.7	10.574
12	7 55 36.16	2.0255	17 34 56.0	7.973	12	9 28 39.94	1.8692	10 2 29.1	10.613
13	7 57 37.56	2.0212	17 26 55.4	8.045	13	9 30 32.03	1.8672	9 51 51.2	10.652
14	7 59 38.71	2.0171	17 18 50.6	8.116	14	9 32 24.00	1.8651	9 41 10.9	10.690
15	8 1 39.61	2.0130	17 10 41.5	8.187	15	9 34 15.84	1.8631	9 30 28.4	10.727
16	8 3 40.27	2.0089	17 2 28.2	8.257	16	9 36 7.57	1.8612	9 19 43.6	10.764
17	8 5 40.68	2.0047	16 54 10.7	8.325	17	9 37 59.19	1.8594	9 8 56.7	10.800
18	8 7 40.84	2.0007	16 45 49.2	8.392	18	9 39 50.70	1.8576	8 58 7.6	10.836
19	8 9 40.77	1.9967	16 37 23.6	8.460	19	9 41 42.10	1.8558	8 47 16.4	10.871
20	8 11 40.45	1.9927	16 28 54.0	8.527	20	9 43 33.40	1.8541	8 36 23.1	10.905
21	8 13 39.90	1.9889	16 20 20.4	8.592	21	9 45 24.59	1.8524	8 25 27.8	10.939
22	8 15 39.12	1.9850	16 11 42.9	8.657	22	9 47 15.69	1.8509	8 14 30.4	10.972
23	8 17 38.10	1.9811	N. 16 3 1.5	8.722	23	9 49 6.70	1.8494	N. 8 3 31.1	11.005
24	8 19 36.85	1.9772				9 50 57.62	1.8479		
THURSDAY 26.					SATURDAY 28.				
0	8 21 35.37	1.9735	N. 15 54 16.3	8.785	0	9 52 48.45	1.8465	N. 7 52 29.8	11.037
1	8 23 33.67	1.9697	15 45 27.3	8.848	1	9 54 39.20	1.8452	7 41 26.6	11.068
2	8 25 31.74	1.9660	15 36 34.5	8.911	2	9 56 29.87	1.8438	7 30 21.6	11.098
3	8 27 29.59	1.9623	15 27 38.0	8.972	3	9 58 20.46	1.8426	7 19 14.8	11.129
4	8 29 27.22	1.9587	15 18 37.9	9.032	4	10 0 10.98	1.8414	7 8 6.1	11.159
5	8 31 24.63	1.9552	15 9 34.1	9.092	5	10 2 1.43	1.8402	6 56 55.7	11.187
6	8 33 21.84	1.9517	15 0 26.8	9.152	6	10 3 51.81	1.8392	6 45 43.6	11.216
7	8 35 18.83	1.9481	14 51 15.9	9.210	7	10 5 42.13	1.8382	6 34 29.8	11.243
8	8 37 15.61	1.9446	14 42 1.6	9.267	8	10 7 32.39	1.8372	6 23 14.4	11.271
9	8 39 12.18	1.9412	14 32 43.8	9.325	9	10 9 22.59	1.8362	6 11 57.3	11.297
10	8 41 8.55	1.9378	14 23 22.6	9.382	10	10 11 12.74	1.8354	6 0 38.7	11.323
11	8 43 4.72	1.9345	14 13 58.0	9.437	11	10 13 2.84	1.8347	5 49 18.5	11.349
12	8 45 0.69	1.9312	14 4 30.1	9.492	12	10 14 52.90	1.8339	5 37 56.8	11.375
13	8 46 56.47	1.9280	13 54 58.9	9.547	13	10 16 42.91	1.8332	5 26 33.7	11.397
14	8 48 52.05	1.9248	13 45 24.5	9.600	14	10 18 32.89	1.8327	5 15 9.2	11.421
15	8 50 47.44	1.9217	13 35 46.9	9.653	15	10 20 22.83	1.8321	5 3 43.2	11.444
16	8 52 42.65	1.9186	13 26 6.1	9.705	16	10 22 12.74	1.8316	4 52 15.9	11.466
17	8 54 37.67	1.9155	13 16 22.3	9.757	17	10 24 2.62	1.8312	4 40 47.3	11.487
18	8 56 32.51	1.9125	13 6 35.3	9.808	18	10 25 52.48	1.8308	4 29 17.4	11.508
19	8 58 27.17	1.9096	12 56 45.3	9.858	19	10 27 42.32	1.8305	4 17 46.3	11.529
20	9 0 21.66	1.9067	12 46 52.3	9.908	20	10 29 32.14	1.8302	4 6 13.9	11.549
21	9 2 15.97	1.9038	12 36 56.3	9.957	21	10 31 21.95	1.8301	3 54 40.4	11.568
22	9 4 10.12	1.9011	12 26 57.5	10.004	22	10 33 11.75	1.8300	3 43 5.7	11.587
23	9 6 4.10	1.8982	12 16 55.8	10.052	23	10 35 1.54	1.8297	3 31 29.9	11.605
24	9 7 57.91	1.8955	N. 12 6 51.2	10.100	24	10 36 51.32	1.8297	N. 3 19 53.1	11.622

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 29.					TUESDAY 31.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	10 36 51.32	1.8297	N. 3 19 53.1	11.622	0	12 5 46.13	1.8973	S. 6 5 40.5	11.675
1	10 38 41.10	1.8297	3 8 15.3	11.638	1	12 7 40.06	1.9002	6 17 20.5	11.658
2	10 40 30.89	1.8299	2 56 36.5	11.655	2	12 9 34.16	1.9031	6 28 59.5	11.641
3	10 42 20.69	1.8301	2 44 56.7	11.671	3	12 11 28.43	1.9060	6 40 37.4	11.622
4	10 44 10.50	1.8303	2 33 16.0	11.686	4	12 13 22.88	1.9090	6 52 14.2	11.603
5	10 46 0.32	1.8305	2 21 34.4	11.700	5	12 15 17.51	1.9121	7 3 49.8	11.582
6	10 47 50.16	1.8308	2 9 52.0	11.713	6	12 17 12.33	1.9152	7 15 24.1	11.562
7	10 49 40.02	1.8312	1 58 8.8	11.727	7	12 19 7.33	1.9183	7 26 57.2	11.540
8	10 51 29.90	1.8316	1 46 24.8	11.739	8	12 21 2.53	1.9216	7 38 28.9	11.517
9	10 53 19.81	1.8322	1 34 40.1	11.751	9	12 22 57.92	1.9248	7 49 59.3	11.494
10	10 55 9.76	1.8327	1 22 54.7	11.762	10	12 24 53.51	1.9281	8 1 28.2	11.469
11	10 56 59.74	1.8333	1 11 8.6	11.772	11	12 26 49.29	1.9314	8 12 55.6	11.444
12	10 58 49.76	1.8340	0 59 22.0	11.782	12	12 28 45.28	1.9349	8 24 21.5	11.418
13	11 0 39.82	1.8347	0 47 34.8	11.792	13	12 30 41.48	1.9383	8 35 45.8	11.391
14	11 2 29.93	1.8356	0 35 47.0	11.800	14	12 32 37.88	1.9418	8 47 8.4	11.362
15	11 4 20.09	1.8364	0 23 58.8	11.807	15	12 34 34.50	1.9454	8 58 29.3	11.334
16	11 6 10.30	1.8372	0 12 10.1	11.815	16	12 36 31.33	1.9490	9 9 48.5	11.304
17	11 8 0.56	1.8382	N. 0 0 21.0	11.822	17	12 38 28.38	1.9527	9 21 5.8	11.273
18	11 9 50.89	1.8393	S. 0 11 28.6	11.828	18	12 40 25.66	1.9565	9 32 21.2	11.242
19	11 11 41.28	1.8404	0 23 18.4	11.833	19	12 42 23.16	1.9602	9 43 34.8	11.210
20	11 13 31.74	1.8416	0 35 8.5	11.837	20	12 44 20.88	1.9640	9 54 46.4	11.176
21	11 15 22.27	1.8428	0 46 58.9	11.842	21	12 46 18.84	1.9679	10 5 55.9	11.141
22	11 17 12.88	1.8441	0 58 49.5	11.845	22	12 48 17.03	1.9717	10 17 3.3	11.106
23	11 19 3.56	1.8453	S. 1 10 40.3	11.847	23	12 50 15.45	1.9757	S. 10 28 8.6	11.069
MONDAY 30.					WEDNESDAY, NOVEMBER 1.				
0	11 20 54.32	1.8467	S. 1 22 31.2	11.849	0	12 52 14.12	1.9797	S. 10 39 11.6	11.032
1	11 22 45.17	1.8482	1 34 22.2	11.850	PHASES OF THE MOON.				
2	11 24 36.10	1.8497	1 46 13.2	11.850					
3	11 26 27.13	1.8512	1 58 4.2	11.850					
4	11 28 18.25	1.8528	2 9 55.2	11.849					
5	11 30 9.47	1.8546	2 21 46.1	11.847	● New Moon . . . . . Oct. 4 7 14.0 ☾ First Quarter . . . . . 11 18 9.6 ○ Full Moon . . . . . 18 10 4.7 ☾ Last Quarter . . . . . 25 21 40.1				
6	11 32 0.80	1.8563	2 33 36.9	11.845					
7	11 33 52.23	1.8581	2 45 27.5	11.842					
8	11 35 43.77	1.8599	2 57 17.9	11.838					
9	11 37 35.42	1.8618	3 9 8.1	11.834	d h m ☾ Perigee . . . . . Oct. 15 22.2 ☾ Apogee . . . . . 27 17.4				
10	11 39 27.19	1.8638	3 20 58.0	11.829					
11	11 41 19.08	1.8658	3 32 47.6	11.823					
12	11 43 11.09	1.8679	3 44 36.8	11.816					
13	11 45 3.23	1.8701	3 56 25.5	11.808					
14	11 46 55.50	1.8723	4 8 13.8	11.801					
15	11 48 47.91	1.8746	4 20 1.6	11.792					
16	11 50 40.45	1.8768	4 31 48.8	11.782					
17	11 52 33.13	1.8792	4 43 35.4	11.771					
18	11 54 25.96	1.8817	4 55 21.3	11.759					
19	11 56 18.93	1.8842	5 7 6.5	11.747					
20	11 58 12.06	1.8867	5 18 51.0	11.735					
21	12 0 5.34	1.8893	5 30 34.7	11.721					
22	12 1 58.78	1.8920	5 42 17.5	11.707					
23	12 3 52.38	1.8946	5 53 59.5	11.692					
24	12 5 46.13	1.8973	S. 6 5 40.5	11.675					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	Aldebaran W.	88 27 38	3069	89 56 26	3065	91 25 19	3060	92 54 18	3054
	Pollux W.	46 49 11	3139	48 16 33	3130	49 44 6	3121	51 11 50	3111
	SUN E.	31 35 53	3473	30 14 59	3472	28 54 4	3471	27 33 9	3473
2	Aldebaran W.	100 20 57	3086	101 50 38	3019	103 20 27	3013	104 50 24	3007
	Pollux W.	58 33 16	3068	60 2 5	3059	61 31 5	3051	63 0 15	3043
	SUN E.	20 49 12	3498	19 28 46	3510	18 8 33	3525	16 48 37	3545
6	SUN W.	25 38 37	3175	27 5 16	3158	28 32 16	3142	29 59 35	3128
	Antares E.	29 23 0	2778	27 48 3	2773	26 13 0	2768	24 37 50	2764
	SATURN E.	40 4 39	2773	38 29 36	2765	36 54 22	2756	35 18 57	2749
	α Aquilæ E.	84 16 32	3221	82 50 48	3216	81 24 58	3212	79 59 3	3208
	Fomalhaut E.	110 28 34	3270	109 3 48	3252	107 38 40	3235	106 13 12	3218
7	SUN W.	37 20 20	3062	38 49 16	3051	40 18 26	3039	41 47 50	3027
	SATURN E.	27 19 12	2708	25 42 43	2700	24 6 3	2692	22 29 13	2685
	α Aquilæ E.	72 48 37	3201	71 22 29	3203	69 56 23	3204	68 30 19	3208
	Fomalhaut E.	99 1 13	3146	97 33 59	3134	96 6 31	3123	94 38 49	3112
8	SUN W.	49 18 25	2971	50 49 14	2961	52 20 16	2950	53 51 32	2939
	α Aquilæ E.	61 21 33	3246	59 56 18	3259	58 31 18	3273	57 6 35	3290
	Fomalhaut E.	87 17 15	3067	85 48 25	3060	84 19 26	3053	82 50 19	3047
	α Pegasi E.	106 50 41	2756	105 15 15	2744	103 39 34	2733	102 3 38	2722
9	SUN W.	61 31 18	2884	63 3 57	2874	64 36 49	2863	66 9 55	2852
	MARS W.	35 8 19	2782	36 43 11	2770	38 18 18	2759	39 53 40	2747
	JUPITER W.	34 40 44	2633	36 18 54	2621	37 57 20	2609	39 36 3	2597
	α Aquilæ E.	50 9 0	3419	48 47 5	3457	47 25 53	3499	46 5 28	3548
	Fomalhaut E.	75 23 16	3030	73 53 40	3029	72 24 3	3029	70 54 26	3030
	α Pegasi E.	94 0 22	2670	92 23 2	2660	90 45 28	2650	89 7 41	2640
10	SUN W.	73 58 56	2798	75 33 27	2787	77 8 12	2775	78 43 12	2765
	MARS W.	47 54 11	2692	49 31 1	2681	51 8 6	2670	52 45 26	2660
	JUPITER W.	47 53 34	2541	49 33 50	2530	51 14 22	2519	52 55 9	2508
	Fomalhaut E.	63 27 12	3055	61 58 7	3064	60 29 13	3075	59 0 33	3089
	α Pegasi E.	80 55 38	2596	79 16 37	2588	77 37 25	2580	75 58 2	2572
11	SUN W.	86 41 45	2710	88 18 11	2700	89 54 51	2689	91 31 45	2678
	JUPITER W.	61 22 49	2455	63 5 6	2444	64 47 38	2433	66 30 25	2423
	MARS W.	60 55 45	2605	62 34 33	2595	64 13 35	2584	65 52 52	2574
	Antares W.	37 19 26	2394	39 3 10	2382	40 47 10	2371	42 31 26	2361
	Fomalhaut E.	51 42 26	3198	50 16 15	3231	48 50 43	3270	47 25 56	3314
	α Pegasi E.	67 38 35	2538	65 58 15	2533	64 17 47	2527	62 37 12	2524
	α Arietis E.	110 25 6	2404	108 41 37	2394	106 57 53	2383	105 13 54	2373
12	SUN W.	99 39 50	2626	101 18 9	2617	102 56 41	2607	104 35 27	2597
	JUPITER W.	75 7 58	2373	76 52 11	2363	78 36 39	2354	80 21 20	2344
	MARS W.	74 12 53	2522	75 53 36	2512	77 34 33	2502	79 15 44	2492
	Antares W.	51 16 38	2309	53 2 25	2298	54 48 27	2289	56 34 43	2279
	SATURN W.	39 56 19	2324	41 41 44	2314	43 27 23	2304	45 13 16	2295
	α Pegasi E.	54 13 10	2513	52 32 15	2515	50 51 22	2517	49 10 32	2522
	α Arietis E.	96 30 21	2323	94 44 55	2313	92 59 15	2304	91 13 22	2295

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
13	SUN W.	106 14 26	2588	107 53 38	2579	109 33 2	2569	111 12 39	2561
	JUPITER W.	82 6 15	2335	83 51 23	2326	85 36 45	2317	87 22 19	2309
	MARS W.	80 57 8	2483	82 38 45	2473	84 20 36	2464	86 2 40	2455
	Antares W.	58 21 14	2270	60 7 58	2260	61 54 56	2251	63 42 7	2243
	SATURN W.	46 59 23	2286	48 45 43	2277	50 32 16	2268	52 19 2	2260
	α Arietis E.	89 27 15	2286	87 40 55	2277	85 54 22	2269	84 7 37	2260
	Aldebaran E.	122 21 15	2301	120 35 17	2290	118 49 3	2281	117 2 35	2270
14	SUN W.	119 33 38	2521	121 14 22	2515	122 55 15	2508	124 36 17	2502
	JUPITER W.	96 13 11	2270	97 59 55	2265	99 46 49	2256	101 33 53	2250
	MARS W.	94 35 59	2415	96 19 13	2408	98 2 37	2401	99 46 11	2394
	Antares W.	72 41 7	2203	74 29 30	2196	76 18 3	2190	78 6 46	2183
	SATURN W.	61 15 56	2220	63 3 53	2214	64 52 0	2207	66 40 17	2201
	α Arietis E.	75 10 55	2224	73 23 3	2217	71 35 1	2212	69 46 51	2206
	Aldebaran E.	108 6 50	2228	106 19 4	2220	104 31 7	2213	102 42 59	2206
15	MARS W.	108 26 10	2367	110 10 32	2364	111 54 59	2359	113 39 32	2357
	Antares W.	87 12 35	2157	89 2 7	2153	90 51 45	2150	92 41 28	2147
	SATURN W.	75 43 51	2175	77 32 56	2171	79 22 7	2167	81 11 24	2165
	α Aquilæ W.	40 59 9	3402	42 21 23	3312	43 45 21	3232	45 10 52	3162
	α Arietis E.	60 44 7	2185	58 55 17	2182	57 6 23	2180	55 17 26	2180
	Aldebaran E.	93 40 2	2180	91 51 4	2176	90 2 0	2172	88 12 50	2169
16	Antares W.	101 50 57	2139	103 40 56	2139	105 30 55	2140	107 20 53	2141
	SATURN W.	90 18 40	2157	92 8 12	2157	93 57 45	2157	95 47 17	2159
	α Aquilæ W.	52 37 1	2908	54 9 10	2872	55 42 5	2841	57 15 40	2813
	α Arietis E.	46 12 36	2181	44 23 45	2188	42 34 59	2192	40 46 20	2198
	Aldebaran E.	79 6 10	2163	77 16 46	2163	75 27 22	2164	73 38 0	2165
	Pollux E.	120 53 3	2206	119 4 45	2204	117 16 23	2202	115 27 58	2201
17	SATURN W.	104 54 15	2172	106 43 25	2176	108 32 28	2182	110 21 23	2187
	α Aquilæ W.	65 11 18	2719	66 47 32	2707	68 24 2	2698	70 0 44	2692
	Fomalhaut W.	40 55 19	3379	42 17 59	3296	43 42 15	3226	45 7 53	3167
	Aldebaran E.	64 32 4	2183	62 43 11	2188	60 54 26	2195	59 5 51	2202
	Pollux E.	106 25 53	2207	104 37 36	2210	102 49 24	2214	101 1 18	2219
18	α Aquilæ W.	78 5 45	2684	79 42 47	2686	81 19 46	2690	82 56 39	2697
	Fomalhaut W.	52 31 26	2962	54 2 26	2937	55 33 58	2916	57 5 57	2897
	Aldebaran E.	50 5 54	2218	48 18 38	2260	46 31 39	2272	44 44 59	2286
	Pollux E.	92 2 54	2253	90 15 46	2262	88 28 50	2271	86 42 8	2281
19	α Aquilæ W.	90 58 23	2747	92 34 1	2761	94 9 20	2775	95 44 20	2792
	Fomalhaut W.	64 50 26	2849	66 23 50	2846	67 57 18	2846	69 30 46	2847
	α Pegasi W.	43 23 50	2573	45 3 22	2568	46 43 1	2565	48 22 44	2565
	Pollux E.	77 52 38	2340	76 7 37	2353	74 22 55	2368	72 38 34	2382
	Regulus E.	114 43 40	2302	112 57 43	2314	111 12 4	2326	109 26 43	2319
20	α Aquilæ W.	103 33 33	2891	105 6 4	2914	106 38 5	2939	108 9 34	2965
	Fomalhaut W.	77 17 5	2876	78 49 55	2885	80 22 33	2896	81 54 57	2908
	α Pegasi W.	56 40 40	2587	58 19 53	2594	59 58 56	2604	61 37 46	2613
	Pollux E.	64 2 17	2463	62 20 12	2480	60 38 31	2498	58 57 15	2517
	Regulus E.	100 44 49	2410	98 1 28	2425	97 18 29	2440	95 35 51	2456

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
13	SUN	W.	112 52 28	2552	114 32 29	2544	116 12 41	2536	117 53 4	2528
	JUPITER	W.	89 8 6	2500	90 54 5	2292	92 40 16	2285	94 26 38	2277
	MARS	W.	87 44 56	2447	89 27 24	2438	91 10 4	2430	92 52 56	2422
	Antares	W.	65 29 30	2235	67 17 6	2226	69 4 55	2218	70 52 55	2210
	SATURN	W.	54 6 1	2251	55 53 12	2243	57 40 35	2235	59 28 10	2228
	α Arietis	E.	82 20 39	2253	80 33 30	2245	78 46 9	2237	76 58 37	2231
	Aldebaran	E.	115 15 52	2262	113 28 56	2252	111 41 46	2244	109 54 24	2236
14	SUN	W.	126 17 27	2497	127 58 45	2491	129 40 11	2487	131 21 43	2483
	JUPITER	W.	103 21 6	2244	105 8 28	2239	106 55 58	2234	108 43 35	2229
	MARS	W.	101 29 54	2388	103 13 46	2382	104 57 47	2377	106 41 55	2372
	Antares	W.	79 55 39	2177	81 44 41	2172	83 33 51	2167	85 23 9	2161
	SATURN	W.	68 28 43	2195	70 17 18	2190	72 6 1	2184	73 54 52	2179
	α Arietis	E.	67 58 32	2200	66 10 5	2196	64 21 32	2192	62 32 52	2188
	Aldebaran	E.	100 54 41	2200	99 6 14	2194	97 17 38	2189	95 28 54	2184
15	MARS	W.	115 24 9	2354	117 8 50	2353	118 53 33	2350	120 38 19	2350
	Antares	W.	94 31 16	2145	96 21 7	2142	98 11 2	2141	100 0 59	2140
	SATURN	W.	83 0 45	2162	84 50 10	2160	86 39 38	2159	88 29 8	2157
	α Aquilæ	W.	46 37 47	2099	48 5 58	2042	49 35 19	2092	51 5 42	2047
	α Arietis	E.	53 28 28	2178	51 39 28	2179	49 50 29	2180	48 1 31	2182
	Aldebaran	E.	86 23 36	2167	84 34 18	2165	82 44 57	2163	80 55 34	2163
16	Antares	W.	109 10 49	2143	111 0 43	2145	112 50 33	2148	114 40 19	2152
	SATURN	W.	97 36 47	2160	99 26 15	2163	101 15 39	2165	103 4 59	2168
	α Aquilæ	W.	58 49 51	2788	60 24 34	2766	61 59 46	2748	63 35 22	2733
	α Arietis	E.	38 57 49	2204	37 9 28	2213	35 21 20	2223	33 33 27	2235
	Aldebaran	E.	71 48 40	2167	69 59 23	2170	68 10 11	2174	66 21 4	2178
	Pollux	E.	113 39 32	2200	111 51 5	2201	110 2 39	2202	108 14 15	2204
17	SATURN	W.	112 10 10	2193	113 58 48	2200	115 47 15	2207	117 35 32	2215
	α Aquilæ	W.	71 37 35	2687	73 14 33	2683	74 51 36	2681	76 28 41	2682
	Fomalhaut	W.	46 34 42	3114	48 2 35	3067	49 31 25	3027	51 1 4	2995
	Aldebaran	E.	57 17 26	2210	55 29 13	2218	53 41 13	2227	51 53 26	2237
	Pollux	E.	99 13 19	2225	97 25 28	2231	95 37 46	2237	93 50 14	2245
18	α Aquilæ	W.	84 33 23	2704	86 9 57	2713	87 46 20	2723	89 22 29	2735
	Fomalhaut	W.	58 38 20	2882	60 11 2	2870	61 43 59	2861	63 17 8	2854
	Aldebaran	E.	42 58 39	2300	41 12 40	2316	39 27 4	2333	37 41 52	2350
	Pollux	E.	84 55 41	2292	83 9 30	2303	81 23 35	2315	79 37 58	2327
19	α Aquilæ	W.	97 18 59	2809	98 53 15	2828	100 27 7	2847	102 0 34	2869
	Fomalhaut	W.	71 4 13	2850	72 37 36	2854	74 10 54	2860	75 44 4	2867
	α Pegasi	W.	50 2 27	2566	51 42 9	2569	53 21 46	2574	55 1 17	2580
	Pollux	E.	70 54 34	2398	69 10 56	2413	67 27 40	2429	65 44 47	2445
	Regulus	E.	107 41 40	2353	105 56 57	2366	104 12 34	2380	102 28 31	2395
20	α Aquilæ	W.	109 40 31	2992	111 10 54	3021	112 40 41	3051	114 9 51	3082
	Fomalhaut	W.	83 27 6	2920	84 58 59	2935	86 30 34	2949	88 1 51	2965
	α Pegasi	W.	63 16 23	2624	64 54 45	2636	66 32 51	2648	68 10 41	2660
	Pollux	E.	57 16 26	2536	55 36 3	2556	53 56 7	2575	52 16 38	2596
	Regulus	E.	93 53 36	2472	92 11 43	2488	90 30 13	2504	88 49 6	2520

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
21	Fomalhaut	W.	89 32 48	2981	91 3 25	2998	92 33 40	3016	94 3 33	3034
	α Pegasi	W.	69 48 14	2674	71 25 29	2687	73 2 26	2701	74 39 4	2716
	α Arietis	W.	26 10 26	2652	27 48 11	2654	29 25 53	2658	31 3 29	2666
	Pollux	E.	50 37 38	2618	48 59 7	2639	47 21 5	2662	45 43 34	2685
	Regulus	E.	87 8 21	2537	85 27 59	2554	83 48 1	2571	82 8 26	2588
22	Fomalhaut	W.	101 26 54	3139	102 54 16	3162	104 21 11	3186	105 47 37	3210
	α Pegasi	W.	82 37 21	2792	84 12 0	2807	85 46 19	2823	87 20 17	2838
	α Arietis	W.	39 8 30	2718	40 44 46	2730	42 20 46	2743	43 56 29	2756
	Pollux	E.	37 44 3	2814	36 9 53	2844	34 36 22	2873	33 3 31	2909
	Regulus	E.	73 56 18	2672	72 19 1	2689	70 42 7	2706	69 5 35	2723
	SUN	E.	134 22 31	3021	132 52 44	3038	131 23 18	3055	129 54 13	3072
23	α Pegasi	W.	95 4 59	2919	96 36 54	2935	98 8 29	2951	99 39 43	2966
	α Arietis	W.	51 50 42	2823	53 24 40	2836	54 58 21	2850	56 31 44	2862
	Regulus	E.	61 8 26	2805	59 34 4	2821	58 0 3	2836	56 26 22	2852
	SUN	E.	122 33 53	3153	121 6 48	3169	119 40 2	3185	118 13 35	3200
24	α Arietis	W.	64 14 34	2926	65 46 20	2937	67 17 52	2949	68 49 9	2960
	Aldebaran	W.	31 32 4	2997	33 2 21	3001	34 32 32	3007	36 2 36	3012
	Regulus	E.	48 42 53	2926	47 11 7	2940	45 39 39	2954	44 8 29	2968
	SUN	E.	111 5 46	3273	109 41 3	3286	108 16 35	3299	106 52 22	3312
25	α Arietis	W.	76 22 13	3010	77 52 13	3029	79 22 2	3028	80 51 40	3035
	Aldebaran	W.	43 31 10	3043	45 0 30	3048	46 29 43	3055	47 58 48	3060
	Regulus	E.	36 36 53	3035	35 7 24	3048	33 38 11	3062	32 9 15	3075
	SUN	E.	99 54 47	3368	98 31 54	3378	97 9 12	3387	95 46 41	3396
26	α Arietis	W.	88 17 35	3069	89 46 22	3074	91 15 3	3080	92 43 37	3084
	Aldebaran	W.	55 22 33	3086	56 51 0	3090	58 19 22	3093	59 47 40	3096
	SUN	E.	88 56 26	3433	87 34 47	3439	86 13 15	3445	84 51 49	3449
27	α Arietis	W.	100 5 17	3100	101 33 27	3102	103 1 34	3103	104 29 40	3104
	Aldebaran	W.	67 8 20	3107	68 36 21	3107	70 4 22	3108	71 32 22	3108
	SUN	E.	78 5 48	3465	76 44 45	3468	75 23 45	3469	74 2 46	3470
28	Aldebaran	W.	78 52 32	3101	80 20 40	3099	81 48 51	3096	83 17 5	3093
	Pollux	W.	37 30 33	3224	38 56 14	3212	40 22 9	3201	41 48 17	3190
	SUN	E.	67 17 51	3465	65 56 48	3463	64 35 43	3460	63 14 34	3457
29	Aldebaran	W.	90 39 24	3072	92 8 8	3065	93 37 0	3060	95 5 59	3054
	Pollux	W.	49 2 1	3141	50 29 21	3131	51 56 53	3122	53 24 36	3112
	SUN	E.	56 27 49	3435	55 6 12	3430	53 44 29	3423	52 22 39	3416
30	Aldebaran	W.	102 32 52	3019	104 2 41	3022	105 32 39	3024	107 2 47	3026
	Pollux	W.	60 46 9	3065	62 15 4	3053	63 44 11	3043	65 13 31	3033
	Regulus	W.	23 45 51	3096	25 14 5	3076	26 42 44	3057	28 11 46	3041
	SUN	E.	45 31 32	3380	44 8 53	3372	42 46 5	3365	41 23 8	3356
31	Pollux	W.	72 43 23	2980	74 14 1	2969	75 44 53	2958	77 15 58	2947
	Regulus	W.	35 41 41	2969	37 12 33	2955	38 43 42	2942	40 15 7	2930
	SUN	E.	34 25 52	3312	33 1 54	3303	31 37 46	3294	30 13 28	3285

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
21	Fomalhaut W.	95 33 3	3054	97 2 9	3074	98 30 50	3096	99 59 5	3117
	α Pegasi W.	76 15 23	2731	77 51 22	2745	79 27 2	2760	81 2 22	2776
	α Arietis W.	32 40 55	2675	34 18 9	2684	35 55 11	2695	37 31 58	2706
	Pollux E.	44 6 34	2709	42 30 6	2734	40 54 11	2759	39 18 49	2786
	Regulus E.	80 29 14	2604	78 50 25	2628	77 12 0	2639	75 33 58	2655
22	Fomalhaut W.	107 13 34	3235	108 39 2	3261	110 3 59	3288	111 28 25	3315
	α Pegasi W.	88 53 55	2855	90 27 12	2871	92 0 8	2887	93 32 44	2903
	α Arietis W.	45 31 55	2769	47 7 3	2782	48 41 54	2796	50 16 27	2810
	Pollux E.	31 31 23	2945	30 0 1	2983	28 29 27	3026	26 59 46	3073
	Regulus E.	67 29 26	2740	65 53 39	2756	64 18 13	2772	62 43 9	2788
	SUN E.	128 25 29	3088	126 57 5	3105	125 29 1	3121	124 1 17	3138
23	α Pegasi W.	101 10 38	2982	102 41 13	2998	104 11 28	3014	105 41 24	3029
	α Arietis W.	58 4 51	2876	59 37 41	2888	61 10 15	2901	62 42 32	2913
	Regulus E.	54 53 2	2867	53 20 1	2883	51 47 20	2897	50 14 57	2912
	SUN E.	116 47 26	3215	115 21 35	3231	113 56 2	3245	112 30 46	3259
24	α Arietis W.	70 20 12	2970	71 51 2	2981	73 21 38	2991	74 52 2	3001
	Aldebaran W.	37 32 34	3018	39 2 24	3024	40 32 7	3030	42 1 42	3036
	Regulus E.	42 37 36	2981	41 7 0	2995	39 36 41	3009	38 6 39	3028
	SUN E.	105 28 24	3324	104 4 40	3336	102 41 10	3346	101 17 52	3358
25	α Arietis W.	82 21 9	3043	83 50 28	3050	85 19 39	3057	86 48 41	3064
	Aldebaran W.	49 27 46	3066	50 56 37	3071	52 25 22	3077	53 54 0	3081
	Regulus E.	30 40 35	3090	29 12 13	3104	27 44 8	3119	26 16 22	3134
	SUN E.	94 24 20	3404	93 2 8	3413	91 40 6	3420	90 18 12	3427
26	α Arietis W.	94 12 6	3088	95 40 30	3092	97 8 49	3095	98 37 5	3098
	Aldebaran W.	61 15 54	3099	62 44 5	3102	64 12 12	3104	65 40 17	3105
	SUN E.	83 30 28	3454	82 9 12	3458	80 48 1	3461	79 26 53	3465
27	α Arietis W.	105 57 45	3105	107 25 49	3105	108 53 53	3105	110 21 57	3104
	Aldebaran W.	73 0 22	3107	74 28 23	3107	75 56 24	3105	77 24 27	3104
	SUN E.	72 41 48	3470	71 20 50	3469	69 59 51	3469	68 38 52	3467
28	Aldebaran W.	84 45 23	3089	86 13 46	3086	87 42 13	3081	89 10 46	3077
	Pollux W.	43 14 38	3180	44 41 11	3170	46 7 56	3160	47 34 53	3151
	SUN E.	61 53 22	3454	60 32 6	3449	59 10 45	3446	57 49 20	3440
29	Aldebaran W.	96 35 5	3047	98 4 19	3041	99 33 41	3034	101 3 12	3026
	Pollux W.	54 52 31	3102	56 20 38	3093	57 48 56	3083	59 17 26	3073
	SUN E.	51 0 41	3470	49 38 36	3405	48 16 23	3396	46 54 2	3388
30	Aldebaran W.	108 33 5	2987	110 3 34	2979	111 34 13	2970	113 5 3	2962
	Pollux W.	66 43 3	3022	68 12 48	3011	69 42 47	3001	71 12 58	2990
	Regulus W.	29 41 8	3026	31 10 49	3010	32 40 49	2997	34 11 6	2982
	SUN E.	40 0 1	3347	38 36 44	3338	37 13 17	3330	35 49 40	3320
31	Pollux W.	78 47 17	2956	80 18 50	2925	81 50 37	2914	83 22 38	2904
	Regulus W.	41 46 48	2917	43 18 45	2904	44 50 59	2891	46 23 29	2879
	SUN E.	28 48 59	3277	27 24 21	3269	25 59 33	3261	24 34 36	3254





## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Wed.	1	h m s 14 25 53.93	s 9.802	S. 14 27 39.8	" -48.09	m s 16 19.55	s 0.054	h m s 14 42 13.48
Thur.	2	14 29 49.58	9.836	14 46 46.9	47.49	16 20.45	0.020	14 46 10.03
Frid.	3	14 33 46.05	9.870	15 5 39.5	46.88	16 20.54	0.014	14 50 6.58
Sat.	4	14 37 43.33	9.904	15 24 17.3	-46.25	16 19.81	0.048	14 54 3.14
SUN.	5	14 41 41.43	9.938	15 42 39.8	45.61	16 18.26	0.082	14 57 59.70
Mon.	6	14 45 40.36	9.972	16 0 46.6	44.95	16 15.89	0.116	15 1 56.25
Tues.	7	14 49 40.10	10.007	16 18 37.4	-44.27	16 12.70	0.150	15 5 52.80
Wed.	8	14 53 40.68	10.041	16 36 11.6	43.57	16 8.68	0.185	15 9 49.36
Thur.	9	14 57 42.08	10.076	16 53 29.0	42.86	16 3.84	0.219	15 13 45.92
Frid.	10	15 1 44.31	10.111	17 10 29.0	-42.13	15 58.17	0.254	15 17 42.47
Sat.	11	15 5 47.36	10.145	17 27 11.3	41.39	15 51.67	0.288	15 21 39.03
SUN.	12	15 9 51.24	10.180	17 43 35.6	40.63	15 44.34	0.322	15 25 35.58
Mon.	13	15 13 55.96	10.214	17 59 41.4	-39.85	15 36.18	0.357	15 29 32.14
Tues.	14	15 18 1.50	10.249	18 15 28.3	39.05	15 27.19	0.392	15 33 28.70
Wed.	15	15 22 7.88	10.283	18 30 55.9	38.24	15 17.37	0.427	15 37 25.25
Thur.	16	15 26 15.10	10.318	18 46 4.0	-37.42	15 6.71	0.462	15 41 21.81
Frid.	17	15 30 23.14	10.352	19 0 52.0	36.58	14 55.23	0.496	15 45 18.36
Sat.	18	15 34 32.01	10.387	19 15 19.7	35.72	14 42.91	0.531	15 49 14.92
SUN.	19	15 38 41.72	10.422	19 29 26.6	-34.85	14 29.76	0.565	15 53 11.48
Mon.	20	15 42 52.25	10.456	19 43 12.5	33.96	14 15.78	0.599	15 57 8.03
Tues.	21	15 47 3.60	10.490	19 56 36.8	33.06	14 0.99	0.633	16 1 4.59
Wed.	22	15 51 15.77	10.524	20 9 39.4	-32.14	13 45.37	0.667	16 5 1.14
Thur.	23	15 55 28.74	10.557	20 22 19.7	31.21	13 28.96	0.701	16 8 57.70
Frid.	24	15 59 42.51	10.590	20 34 37.6	30.27	13 11.75	0.734	16 12 54.26
Sat.	25	16 3 57.08	10.623	20 46 32.5	-29.31	12 53.74	0.766	16 16 50.81
SUN.	26	16 8 12.41	10.655	20 58 4.2	28.33	12 34.96	0.798	16 20 47.37
Mon.	27	16 12 28.50	10.686	21 9 12.4	27.34	12 15.43	0.830	16 24 43.93
Tues.	28	16 16 45.33	10.716	21 19 56.6	-26.34	11 55.15	0.860	16 28 40.48
Wed.	29	16 21 2.88	10.746	21 30 16.6	25.32	11 34.16	0.889	16 32 37.04
Thur.	30	16 25 21.13	10.774	21 40 12.1	24.29	11 12.47	0.917	16 36 33.60
Frid.	31	16 29 40.05	10.802	S. 21 49 42.7	-23.25	10 50.11	0.945	16 40 30.16

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,  
+9°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.	
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	305	218 52 9.3	51 11.4	150.27	— 0.59	9.9965223	—46.2	h m s 9 16 15.15	
2	306	219 52 16.8	51 18.7	150.35	0.52	9.9964116	46.0	9 12 19.24	
3	307	220 52 26.2	51 28.0	150.43	0.41	9.9963013	45.9	9 8 23.33	
4	308	221 52 37.6	51 39.3	150.50	— 0.29	9.9961915	—45.7	9 4 27.42	
5	309	222 52 50.6	51 52.1	150.57	0.17	9.9960821	45.4	9 0 31.51	
6	310	223 53 5.1	52 6.5	150.64	— 0.03	9.9959734	45.1	8 56 35.60	
7	311	224 53 21.4	52 22.7	150.71	+ 0.11	9.9958655	—44.8	8 52 39.69	
8	312	225 53 39.2	52 40.3	150.77	0.23	9.9957583	44.4	8 48 43.78	
9	313	226 53 58.4	52 59.4	150.83	0.34	9.9956521	44.0	8 44 47.87	
10	314	227 54 19.1	53 19.9	150.89	+ 0.42	9.9955471	—43.5	8 40 51.96	
11	315	228 54 41.1	53 41.8	150.95	0.48	9.9954434	42.9	8 36 56.05	
12	316	229 55 4.6	54 5.2	151.01	0.52	9.9953412	42.3	8 33 0.14	
13	317	230 55 29.4	54 29.8	151.06	+ 0.51	9.9952405	—41.6	8 29 4.23	
14	318	231 55 55.7	54 56.0	151.12	0.48	9.9951416	40.8	8 25 8.32	
15	319	232 56 23.4	55 23.5	151.18	0.41	9.9950446	40.0	8 21 12.41	
16	320	233 56 52.4	55 52.4	151.24	+ 0.33	9.9949496	—39.2	8 17 16.50	
17	321	234 57 22.8	56 22.6	151.30	0.22	9.9948567	38.3	8 13 20.59	
18	322	235 57 54.9	56 54.6	151.37	+ 0.10	9.9947659	37.4	8 9 24.68	
19	323	236 58 28.5	57 28.0	151.43	— 0.02	9.9946772	—36.5	8 5 28.77	
20	324	237 59 3.6	58 3.0	151.50	0.15	9.9945907	35.6	8 1 32.86	
21	325	238 59 40.4	58 39.6	151.57	0.28	9.9945064	34.7	7 57 36.95	
22	326	239 60 18.8	59 17.8	151.64	— 0.40	9.9944241	—33.8	7 53 41.04	
23	327	240 60 58.7	59 57.6	151.70	0.49	9.9943439	33.0	7 49 45.13	
24	328	242 1 40.4	0 39.1	151.77	0.56	9.9942655	32.2	7 45 49.22	
25	329	243 2 23.7	1 22.3	151.84	— 0.60	9.9941891	—31.5	7 41 53.31	
26	330	244 3 8.6	2 7.0	151.91	0.61	9.9941144	30.8	7 37 57.40	
27	331	245 3 55.1	2 53.3	151.97	0.59	9.9940412	30.1	7 34 1.49	
28	332	246 4 43.1	3 41.2	152.03	— 0.55	9.9939696	—29.5	7 30 5.58	
29	333	247 5 32.6	4 30.5	152.09	0.47	9.9938995	28.9	7 26 9.66	
30	334	248 6 23.5	5 21.3	152.15	0.37	9.9938307	28.3	7 22 13.75	
31	335	249 7 15.7	6 13.3	152.20	— 0.25	9.9937633	—27.8	7 18 17.84	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)	

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	15 8.2	15 12.4	55 26.4	+1.26	55 42.0	+1.32	22 52.7	1.98	27.7	
2	15 16.8	15 21.3	55 58.0	1.35	56 14.4	1.37	23 41.9	2.12	28.7	
3	15 25.7	15 30.2	56 30.8	1.36	56 47.1	1.34	6		0.1	
4	15 34.5	15 38.6	57 2.9	+1.30	57 18.2	+1.25	0 34.3	2.25	1.1	
5	15 42.6	15 46.4	57 32.8	1.19	57 46.7	1.12	1 29.6	2.35	2.1	
6	15 49.9	15 53.2	57 59.6	1.05	58 11.7	0.97	2 26.8	2.40	3.1	
7	15 56.3	15 59.1	58 22.9	+0.90	58 33.2	+0.82	3 24.3	2.38	4.1	
8	16 1.6	16 3.9	58 42.6	0.75	58 51.1	0.67	4 20.7	2.31	5.1	
9	16 6.0	16 7.8	58 58.7	0.60	59 5.3	0.52	5 15.2	2.23	6.1	
10	16 9.4	16 10.6	59 11.1	+0.43	59 15.6	+0.33	6 7.6	2.15	7.1	
11	16 11.6	16 12.2	59 19.1	+0.24	59 21.4	+0.13	6 58.6	2.10	8.1	
12	16 12.4	16 12.2	59 22.2	0.00	59 21.4	-0.13	7 48.7	2.09	9.1	
13	16 11.5	16 10.3	59 18.9	-0.28	59 14.6	-0.44	8 39.1	2.12	10.1	
14	16 8.6	16 6.4	59 8.3	0.61	59 0.0	0.78	9 30.5	2.17	11.1	
15	16 3.5	16 0.2	58 49.7	0.94	58 37.4	1.10	10 23.5	2.25	12.1	
16	15 56.3	15 52.0	58 23.2	-1.26	58 7.2	-1.39	11 18.2	2.31	13.1	
17	15 47.2	15 42.2	57 49.8	1.50	57 31.2	1.59	12 13.9	2.33	14.1	
18	15 36.9	15 31.4	57 11.7	1.65	56 51.6	1.68	13 9.5	2.29	15.1	
19	15 25.9	15 20.4	56 31.4	-1.68	56 11.4	-1.64	14 3.7	2.21	16.1	
20	15 15.2	15 10.2	55 52.0	1.58	55 33.6	1.48	14 55.4	2.09	17.1	
21	15 5.5	15 1.3	55 16.4	1.36	55 0.9	1.22	15 44.0	1.96	18.1	
22	14 57.5	14 54.3	54 47.2	-1.05	54 35.5	-0.88	16 29.7	1.85	19.1	
23	14 51.8	14 49.9	54 26.1	0.68	54 19.2	0.46	17 13.1	1.76	20.1	
24	14 48.7	14 48.2	54 14.9	-0.25	54 13.1	-0.03	17 54.7	1.71	21.1	
25	14 48.5	14 49.5	54 14.0	+0.19	54 17.6	+0.40	18 35.7	1.70	22.1	
26	14 51.1	14 53.5	54 23.8	0.62	54 32.5	0.83	19 16.9	1.74	23.1	
27	14 56.6	15 0.2	54 43.7	1.03	54 57.1	1.20	19 59.3	1.81	24.1	
28	15 4.4	15 9.1	55 12.5	+1.36	55 29.8	+1.50	20 44.0	1.92	25.1	
29	15 14.2	15 19.6	55 48.5	1.61	56 8.4	1.69	21 31.8	2.06	26.1	
30	15 25.3	15 31.0	56 29.1	1.74	56 50.2	1.76	22 23.2	2.22	27.1	
31	15 36.8	15 42.4	57 11.3	+1.75	57 32.1	+1.70	23 18.2	2.36	28.1	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 1.					FRIDAY 3.				
0	h m s	s	S. 10 39 11.6	11.032	0	h m s	s	S. 18 26 6.1	8.003
1	12 54 13.02	1.9838	10 50 12.4	10.993	1	14 34 48.02	2.2113	18 34 3.6	7.913
2	12 56 12.17	1.9879	11 1 10.8	10.954	2	14 37 1.17	2.2218	18 41 55.6	7.821
3	12 58 11.57	1.9921	11 12 6.9	10.915	3	14 39 14.63	2.2369	18 49 42.1	7.728
4	13 0 11.22	1.9963	11 23 0.6	10.873	4	14 41 28.40	2.2522	18 57 23.0	7.634
5	13 2 11.12	2.0004	11 33 51.7	10.831	5	14 43 42.49	2.2673	19 4 58.2	7.538
6	13 4 11.27	2.0047	11 44 40.3	10.788	6	14 45 56.88	2.2824	19 12 27.6	7.443
7	13 6 11.68	2.0090	11 55 26.2	10.743	7	14 48 11.58	2.2976	19 19 51.3	7.346
8	13 8 12.35	2.0134	12 6 9.5	10.698	8	14 50 26.59	2.3128	19 27 9.1	7.248
9	13 10 13.29	2.0178	12 16 50.0	10.652	9	14 52 41.91	2.3279	19 34 21.0	7.148
10	13 12 14.49	2.0223	12 27 27.7	10.604	10	14 54 57.54	2.3430	19 41 26.8	7.047
11	13 14 15.96	2.0268	12 38 2.5	10.556	11	14 57 13.47	2.3580	19 48 26.6	6.946
12	13 16 17.70	2.0313	12 48 34.4	10.507	12	14 59 29.70	2.3730	19 55 20.3	6.843
13	13 18 19.71	2.0358	12 59 3.3	10.457	13	15 1 46.23	2.3880	20 2 7.7	6.738
14	13 20 21.99	2.0403	13 9 29.2	10.405	14	15 4 3.06	2.4030	20 8 48.9	6.633
15	13 22 24.55	2.0450	13 19 51.9	10.353	15	15 6 20.19	2.4180	20 15 23.7	6.527
16	13 24 27.39	2.0497	13 30 11.5	10.300	16	15 8 37.62	2.4329	20 21 52.1	6.420
17	13 26 30.51	2.0543	13 40 27.9	10.245	17	15 10 55.34	2.4478	20 28 14.1	6.312
18	13 28 33.91	2.0591	13 50 40.9	10.189	18	15 13 13.35	2.4627	20 34 29.6	6.203
19	13 30 37.60	2.0639	14 0 50.6	10.132	19	15 15 31.66	2.4775	20 40 38.5	6.093
20	13 32 41.58	2.0687	14 10 56.8	10.074	20	15 17 50.25	2.4923	20 46 40.7	5.981
21	13 34 45.84	2.0735	14 20 59.5	10.016	21	15 20 9.13	2.5070	20 52 36.2	5.868
22	13 36 50.40	2.0784	14 30 58.7	9.957	22	15 22 28.29	2.5217	20 58 24.9	5.755
23	13 38 55.25	2.0833	S. 14 40 54.3	9.895	23	15 24 47.73	2.5364	S. 21 4 6.8	5.641
THURSDAY 2.					SATURDAY 4.				
0	h m s	s	S. 14 50 46.1	9.833	0	h m s	s	S. 21 9 41.8	5.525
1	13 43 5.83	2.0931	15 0 34.2	9.769	1	15 29 27.46	2.5516	21 15 9.8	5.408
2	13 45 11.56	2.0980	15 10 18.4	9.704	2	15 31 47.73	2.5661	21 20 30.8	5.292
3	13 47 17.59	2.1031	15 19 58.7	9.639	3	15 34 8.27	2.5806	21 25 44.8	5.173
4	13 49 23.93	2.1081	15 29 35.1	9.573	4	15 36 29.08	2.5950	21 30 51.6	5.053
5	13 51 30.56	2.1131	15 39 7.5	9.505	5	15 38 50.15	2.6093	21 35 51.2	4.933
6	13 53 37.50	2.1182	15 48 35.7	9.436	6	15 41 11.48	2.6237	21 40 43.5	4.811
7	13 55 44.74	2.1233	15 57 59.8	9.367	7	15 43 33.07	2.6380	21 45 28.5	4.689
8	13 57 52.29	2.1283	16 7 19.7	9.295	8	15 45 54.91	2.6523	21 50 6.2	4.567
9	14 0 0.14	2.1334	16 16 35.2	9.223	9	15 48 17.00	2.6666	21 54 36.5	4.443
10	14 2 8.30	2.1386	16 25 46.4	9.149	10	15 50 39.34	2.6808	21 58 59.3	4.317
11	14 4 16.77	2.1437	16 34 53.1	9.074	11	15 53 1.92	2.6950	22 3 14.5	4.191
12	14 6 25.54	2.1488	16 43 55.3	8.999	12	15 55 24.73	2.7092	22 7 22.2	4.065
13	14 8 34.63	2.1541	16 52 53.0	8.923	13	15 57 47.78	2.7234	22 11 22.3	3.938
14	14 10 44.03	2.1593	17 1 46.0	8.844	14	16 0 11.06	2.7376	22 15 14.7	3.808
15	14 12 53.74	2.1644	17 10 34.3	8.766	15	16 2 34.56	2.7517	22 18 59.3	3.679
16	14 15 3.76	2.1696	17 19 17.9	8.686	16	16 4 58.29	2.7658	22 22 36.2	3.549
17	14 17 14.09	2.1748	17 27 56.6	8.604	17	16 7 22.24	2.7799	22 26 5.2	3.418
18	14 19 24.73	2.1800	17 36 30.4	8.522	18	16 9 46.40	2.7940	22 29 26.4	3.288
19	14 21 35.69	2.1853	17 44 59.2	8.438	19	16 12 10.76	2.8080	22 32 39.7	3.155
20	14 23 46.96	2.1905	17 53 22.9	8.353	20	16 14 35.33	2.8220	22 35 45.0	3.022
21	14 25 58.55	2.1958	18 1 41.5	8.268	21	16 17 0.10	2.8360	22 38 42.3	2.888
22	14 28 10.45	2.2009	18 9 55.0	8.181	22	16 19 25.06	2.8500	22 41 31.6	2.754
23	14 30 22.66	2.2061	18 18 3.2	8.093	23	16 21 50.21	2.8640	22 44 12.8	2.619
24	14 32 35.18	2.2113	S. 18 26 6.1	8.003	24	16 24 15.54	2.8780	S. 22 46 45.9	2.483

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 5.					TUESDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	16 24 15.54	2.4237	S. 22 46 45.9	2.483	1	18 22 19.82	2.4595	S. 22 2 39.4	4.352
2	16 26 41.05	2.4267	22 49 10.8	2.547	2	18 24 47.35	2.4580	21 58 14.1	4.492
3	16 29 6.74	2.4296	22 51 27.5	2.210	3	18 27 14.78	2.4563	21 53 40.4	4.631
4	16 31 32.60	2.4323	22 53 36.0	2.073	4	18 29 42.11	2.4548	21 48 58.4	4.769
5	16 33 58.62	2.4350	22 55 36.2	1.934	5	18 32 9.35	2.4531	21 44 8.1	4.908
6	16 36 24.80	2.4376	22 57 28.1	1.796	6	18 34 36.48	2.4512	21 39 9.5	5.045
7	16 38 51.13	2.4401	22 59 11.7	1.657	7	18 37 3.49	2.4493	21 34 2.7	5.182
8	16 41 17.61	2.4425	23 0 46.9	1.518	8	18 39 30.40	2.4474	21 28 47.7	5.318
9	16 43 44.23	2.4448	23 2 13.8	1.378	9	18 41 57.18	2.4453	21 23 24.6	5.453
10	16 46 10.99	2.4471	23 3 32.2	1.237	10	18 44 23.84	2.4433	21 17 53.3	5.588
11	16 48 37.88	2.4493	23 4 42.2	1.096	11	18 46 50.38	2.4413	21 12 14.0	5.723
12	16 51 4.90	2.4513	23 5 43.7	0.954	12	18 49 16.79	2.4390	21 6 26.6	5.856
13	16 53 32.03	2.4532	23 6 36.7	0.813	13	18 51 43.06	2.4367	21 0 31.3	5.988
14	16 55 59.28	2.4551	23 7 21.2	0.670	14	18 54 9.19	2.4343	20 54 28.0	6.122
15	16 58 26.64	2.4568	23 7 57.1	0.528	15	18 56 35.18	2.4320	20 48 16.7	6.253
16	17 0 54.10	2.4584	23 8 24.5	0.385	16	18 59 1.03	2.4296	20 41 57.6	6.383
17	17 3 21.65	2.4600	23 8 43.3	0.242	17	19 1 26.73	2.4270	20 35 30.7	6.513
18	17 5 49.30	2.4615	23 8 53.5	-0.098	18	19 3 52.27	2.4244	20 28 56.0	6.643
19	17 8 17.03	2.4628	23 8 55.1	+0.045	19	19 6 17.66	2.4219	20 22 13.6	6.771
20	17 10 44.84	2.4642	23 8 48.1	0.189	20	19 8 42.90	2.4193	20 15 23.5	6.898
21	17 13 12.73	2.4653	23 8 32.4	0.333	21	19 11 7.97	2.4165	20 8 25.8	7.025
22	17 15 40.68	2.4664	23 8 8.1	0.478	22	19 13 32.88	2.4138	20 1 20.5	7.151
23	17 18 8.70	2.4675	23 7 35.1	0.622	23	19 15 57.62	2.4109	19 54 7.7	7.276
24	17 20 36.78	2.4683	S. 23 6 53.5	0.766	24	19 18 22.19	2.4081	S. 19 46 47.4	7.400
MONDAY 6.					WEDNESDAY 8.				
0	17 23 4.90	2.4691	S. 23 6 3.2	0.911	0	19 20 46.59	2.4053	S. 19 39 19.7	7.523
1	17 25 33.07	2.4698	23 5 4.2	1.056	1	19 23 10.82	2.4023	19 31 44.6	7.646
2	17 28 1.27	2.4703	23 3 56.5	1.201	2	19 25 34.87	2.3995	19 24 2.2	7.768
3	17 30 29.51	2.4708	23 2 40.1	1.345	3	19 27 58.74	2.3965	19 16 12.5	7.888
4	17 32 57.77	2.4712	23 1 15.1	1.490	4	19 30 22.43	2.3933	19 8 15.7	8.007
5	17 35 26.05	2.4715	22 59 41.3	1.635	5	19 32 45.94	2.3903	19 0 11.7	8.126
6	17 37 54.35	2.4718	22 57 58.9	1.779	6	19 35 9.27	2.3873	18 52 0.6	8.243
7	17 40 22.66	2.4718	22 56 7.8	1.924	7	19 37 32.41	2.3841	18 43 42.5	8.360
8	17 42 50.97	2.4718	22 54 8.0	2.069	8	19 39 55.36	2.3810	18 35 17.4	8.476
9	17 45 19.28	2.4717	22 51 59.5	2.214	9	19 42 18.13	2.3779	18 26 45.4	8.590
10	17 47 47.58	2.4715	22 49 42.3	2.358	10	19 44 40.71	2.3748	18 18 6.6	8.703
11	17 50 15.86	2.4713	22 47 16.5	2.503	11	19 47 3.10	2.3715	18 9 21.0	8.816
12	17 52 44.13	2.4709	22 44 42.0	2.647	12	19 49 25.29	2.3683	18 0 28.7	8.928
13	17 55 12.37	2.4704	22 41 58.9	2.791	13	19 51 47.29	2.3651	17 51 29.7	9.038
14	17 57 40.58	2.4698	22 39 7.1	2.934	14	19 54 9.10	2.3618	17 42 24.1	9.147
15	18 0 8.75	2.4692	22 36 6.8	3.078	15	19 56 30.71	2.3585	17 33 12.0	9.255
16	18 2 36.88	2.4685	22 32 57.8	3.221	16	19 58 52.12	2.3553	17 23 53.5	9.363
17	18 5 4.97	2.4677	22 29 40.3	3.365	17	20 1 13.34	2.3520	17 14 28.5	9.469
18	18 7 33.00	2.4668	22 26 14.2	3.506	18	20 3 34.36	2.3487	17 4 57.2	9.574
19	18 10 0.98	2.4658	22 22 39.6	3.648	19	20 5 55.18	2.3454	16 55 19.6	9.678
20	18 12 28.89	2.4647	22 18 56.5	3.789	20	20 8 15.81	2.3422	16 45 35.8	9.781
21	18 14 56.74	2.4635	22 15 4.9	3.931	21	20 10 36.24	2.3388	16 35 45.9	9.882
22	18 17 24.51	2.4623	22 11 4.8	4.072	22	20 12 56.47	2.3356	16 25 50.0	9.983
23	18 19 52.21	2.4609	22 6 56.3	4.212	23	20 15 16.51	2.3323	16 15 48.0	10.083
24	18 22 19.82	2.4595	S. 22 2 39.4	4.352	24	20 17 36.34	2.3289	S. 16 5 40.1	10.181

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 9.					SATURDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	20 17 36.34	2.3289	S. 16 5 40.1	10.181	1	22 6 1.43	2.2024	S. 6 26 50.6	13.455
2	20 19 55.98	2.3257	15 55 26.3	10.278	2	22 8 13.53	2.2009	6 13 22.2	13.492
3	20 22 15.42	2.3224	15 45 6.8	10.373	3	22 10 25.54	2.1994	5 59 51.6	13.528
4	20 24 34.67	2.3192	15 34 41.5	10.468	4	22 12 37.46	2.1980	5 46 18.9	13.562
5	20 26 53.72	2.3159	15 24 10.6	10.562	5	22 14 49.30	2.1966	5 32 44.2	13.594
6	20 29 12.58	2.3127	15 13 34.1	10.654	6	22 17 1.05	2.1953	5 19 7.6	13.626
7	20 31 31.24	2.3094	15 2 52.1	10.745	7	22 19 12.73	2.1941	5 5 29.1	13.657
8	20 33 49.71	2.3062	14 52 4.7	10.835	8	22 21 24.34	2.1928	4 51 48.8	13.686
9	20 36 7.98	2.3029	14 41 11.9	10.924	9	22 23 35.87	2.1916	4 38 6.8	13.713
10	20 38 26.06	2.2998	14 30 13.8	11.012	10	22 25 47.33	2.1905	4 24 23.2	13.740
11	20 40 43.96	2.2967	14 19 10.5	11.098	11	22 27 58.73	2.1896	4 10 38.0	13.766
12	20 43 1.66	2.2935	14 8 2.0	11.184	12	22 30 10.08	2.1886	3 56 51.3	13.790
13	20 45 19.18	2.2904	13 56 48.4	11.268	13	22 32 21.36	2.1876	3 43 3.2	13.813
14	20 47 36.51	2.2873	13 45 29.8	11.351	14	22 34 32.59	2.1868	3 29 13.8	13.833
15	20 49 53.66	2.2843	13 34 6.3	11.432	15	22 36 43.78	2.1861	3 15 23.2	13.853
16	20 52 10.62	2.2812	13 22 38.0	11.512	16	22 38 54.92	2.1853	3 1 31.5	13.871
17	20 54 27.40	2.2782	13 11 4.9	11.592	17	22 41 6.01	2.1846	2 47 38.7	13.889
18	20 56 44.00	2.2752	12 59 27.0	11.670	18	22 43 17.07	2.1840	2 33 44.8	13.905
19	20 59 0.42	2.2722	12 47 44.5	11.746	19	22 45 28.09	2.1834	2 19 50.1	13.918
20	21 1 16.66	2.2693	12 35 57.5	11.821	20	22 47 39.08	2.1830	2 5 54.6	13.932
21	21 3 32.73	2.2664	12 24 6.0	11.896	21	22 49 50.05	2.1826	1 51 58.3	13.944
22	21 5 48.63	2.2636	12 12 10.0	11.969	22	22 52 0.99	2.1822	1 38 1.3	13.954
23	21 8 4.36	2.2608	12 0 9.7	12.040	23	22 54 11.91	2.1818	1 24 3.8	13.963
24	21 10 19.92	2.2579	S. 11 48 5.2	12.110	24	22 56 22.81	2.1816	S. 1 10 5.7	13.972
FRIDAY 10.					SUNDAY 12.				
0	21 12 35.31	2.2552	S. 11 35 56.5	12.179	0	22 58 33.70	2.1814	S. 0 56 7.2	13.978
1	21 14 50.54	2.2524	11 23 43.7	12.248	1	23 0 44.58	2.1813	0 42 8.4	13.983
2	21 17 5.60	2.2497	11 11 26.8	12.314	2	23 2 55.46	2.1813	0 28 9.3	13.987
3	21 19 20.50	2.2471	10 59 6.0	12.379	3	23 5 6.33	2.1813	0 14 10.0	13.989
4	21 21 35.25	2.2446	10 46 41.3	12.443	4	23 7 17.21	2.1813	S. 0 0 10.6	13.990
5	21 23 49.85	2.2420	10 34 12.8	12.506	5	23 9 28.09	2.1814	N. 0 13 48.8	13.990
6	21 26 4.29	2.2394	10 21 40.6	12.568	6	23 11 38.98	2.1817	0 27 48.2	13.989
7	21 28 18.58	2.2369	10 9 4.7	12.628	7	23 13 49.89	2.1819	0 41 47.5	13.986
8	21 30 32.72	2.2345	9 56 25.2	12.687	8	23 16 0.81	2.1822	0 55 46.5	13.981
9	21 32 46.72	2.2322	9 43 42.3	12.744	9	23 18 11.75	2.1825	1 9 45.2	13.976
10	21 35 0.58	2.2298	9 30 55.9	12.801	10	23 20 22.71	2.1829	1 23 43.6	13.969
11	21 37 14.30	2.2276	9 18 6.2	12.856	11	23 22 33.70	2.1835	1 37 41.5	13.960
12	21 39 27.89	2.2253	9 5 13.2	12.910	12	23 24 44.73	2.1841	1 51 38.8	13.950
13	21 41 41.34	2.2232	8 52 17.0	12.963	13	23 26 55.79	2.1846	2 5 35.5	13.940
14	21 43 54.67	2.2211	8 39 17.7	13.013	14	23 29 6.88	2.1852	2 19 31.6	13.928
15	21 46 7.87	2.2189	8 26 15.4	13.063	15	23 31 18.01	2.1859	2 33 26.8	13.913
16	21 48 20.94	2.2168	8 13 10.1	13.112	16	23 33 29.19	2.1868	2 47 21.2	13.899
17	21 50 33.89	2.2148	8 0 2.0	13.159	17	23 35 40.42	2.1876	3 1 14.7	13.883
18	21 52 46.72	2.2129	7 46 51.0	13.206	18	23 37 51.70	2.1884	3 15 7.1	13.864
19	21 54 59.44	2.2111	7 33 37.3	13.251	19	23 40 3.03	2.1893	3 28 58.4	13.846
20	21 57 12.05	2.2093	7 20 20.9	13.294	20	23 42 14.42	2.1904	3 42 48.6	13.826
21	21 59 24.55	2.2075	7 7 2.0	13.336	21	23 44 25.88	2.1915	3 56 37.5	13.803
22	22 1 36.95	2.2058	6 53 40.6	13.377	22	23 46 37.40	2.1925	4 10 25.0	13.780
23	22 3 49.24	2.2040	6 40 16.8	13.417	23	23 48 48.98	2.1937	4 24 11.1	13.756
24	22 6 1.43	2.2024	S. 6 26 50.6	13.455	24	23 51 0.64	2.1949	N. 4 37 55.7	13.730

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 13.					WEDNESDAY 15.				
0	h m s	s	N. ° ' "	"	0	h m s	s	N. ° ' "	"
0	23 51 0.64	2.1949	4 37 55.7	13.730	0	1 38 36.29	2.3005	14 41 11.5	10.894
1	23 53 12.37	2.1962	4 51 38.7	13.703	1	1 40 54.40	2.3032	14 52 2.4	10.803
2	23 55 24.18	2.1956	5 5 20.0	13.673	2	1 43 12.67	2.3059	15 2 47.8	10.711
3	23 57 36.07	2.1988	5 18 59.5	13.643	3	1 45 31.11	2.3087	15 13 27.7	10.618
4	23 59 48.04	2.2003	5 32 37.2	13.612	4	1 47 49.71	2.3113	15 24 1.9	10.523
5	0 2 0.10	2.2018	5 46 12.9	13.579	5	1 50 8.47	2.3141	15 34 30.4	10.428
6	0 4 12.25	2.2033	5 59 46.7	13.545	6	1 52 27.40	2.3168	15 44 53.2	10.331
7	0 6 24.50	2.2049	6 13 18.3	13.509	7	1 54 46.49	2.3195	15 55 10.1	10.233
8	0 8 36.84	2.2065	6 26 47.8	13.473	8	1 57 5.74	2.3222	16 5 21.1	10.133
9	0 10 49.28	2.2082	6 40 15.0	13.434	9	1 59 25.15	2.3248	16 15 26.1	10.033
10	0 13 1.82	2.2098	6 53 39.9	13.395	10	2 1 44.72	2.3275	16 25 25.1	9.932
11	0 15 14.46	2.2116	7 7 2.4	13.353	11	2 4 4.45	2.3301	16 35 17.9	9.829
12	0 17 27.21	2.2134	7 20 22.3	13.311	12	2 6 24.33	2.3328	16 45 4.6	9.726
13	0 19 40.07	2.2153	7 33 39.7	13.268	13	2 8 44.38	2.3354	16 54 45.0	9.621
14	0 21 53.04	2.2172	7 46 54.4	13.223	14	2 11 4.58	2.3379	17 4 19.1	9.515
15	0 24 6.13	2.2192	8 0 6.4	13.176	15	2 13 24.93	2.3405	17 13 46.8	9.408
16	0 26 19.34	2.2212	8 13 15.5	13.128	16	2 15 45.44	2.3431	17 23 8.1	9.300
17	0 28 32.67	2.2232	8 26 21.7	13.078	17	2 18 6.10	2.3456	17 32 22.8	9.191
18	0 30 46.12	2.2253	8 39 24.9	13.028	18	2 20 26.91	2.3481	17 41 31.0	9.082
19	0 32 59.70	2.2273	8 52 25.1	12.977	19	2 22 47.87	2.3505	17 50 32.6	8.971
20	0 35 13.40	2.2294	9 5 22.1	12.923	20	2 25 8.97	2.3529	17 59 27.5	8.859
21	0 37 27.23	2.2317	9 18 15.9	12.868	21	2 27 30.22	2.3553	18 8 15.7	8.746
22	0 39 41.20	2.2339	9 31 6.3	12.813	22	2 29 51.61	2.3577	18 16 57.0	8.632
23	0 41 55.30	2.2362	N. 9 43 53.4	12.755	23	2 32 13.14	2.3600	N. 18 25 31.5	8.517
TUESDAY 14.					THURSDAY 16.				
0	0 44 9.54	2.2385	N. 9 56 36.9	12.696	0	2 34 34.81	2.3623	N. 18 33 59.0	8.401
1	0 46 23.92	2.2408	10 9 16.9	12.637	1	2 36 56.61	2.3645	18 42 19.6	8.284
2	0 48 38.43	2.2431	10 21 53.3	12.575	2	2 39 18.55	2.3667	18 50 33.1	8.167
3	0 50 53.09	2.2455	10 34 25.9	12.512	3	2 41 40.62	2.3689	18 58 39.6	8.048
4	0 53 7.89	2.2479	10 46 54.7	12.448	4	2 44 2.82	2.3710	19 6 38.9	7.929
5	0 55 22.84	2.2503	10 59 19.6	12.383	5	2 46 25.14	2.3730	19 14 31.1	7.809
6	0 57 37.93	2.2528	11 11 40.6	12.317	6	2 48 47.58	2.3750	19 22 16.0	7.688
7	0 59 53.18	2.2553	11 23 57.6	12.248	7	2 51 10.14	2.3770	19 29 53.7	7.567
8	1 2 8.57	2.2578	11 36 10.4	12.178	8	2 53 32.82	2.3789	19 37 24.0	7.443
9	1 4 24.12	2.2604	11 48 19.0	12.108	9	2 55 55.61	2.3808	19 44 46.9	7.320
10	1 6 39.82	2.2629	12 0 23.4	12.037	10	2 58 18.51	2.3826	19 52 2.4	7.197
11	1 8 55.67	2.2655	12 12 23.4	11.963	11	3 0 41.52	2.3844	19 59 10.5	7.072
12	1 11 11.68	2.2682	12 24 18.9	11.888	12	3 3 4.64	2.3862	20 6 11.0	6.946
13	1 13 27.85	2.2708	12 36 9.9	11.812	13	3 5 27.86	2.3878	20 13 4.0	6.819
14	1 15 44.17	2.2734	12 47 56.3	11.735	14	3 7 51.17	2.3893	20 19 49.3	6.692
15	1 18 0.66	2.2761	12 59 38.1	11.658	15	3 10 14.57	2.3908	20 26 27.0	6.565
16	1 20 17.30	2.2787	13 11 15.2	11.578	16	3 12 38.06	2.3922	20 32 57.1	6.437
17	1 22 34.10	2.2814	13 22 47.4	11.496	17	3 15 1.63	2.3936	20 39 19.4	6.308
18	1 24 51.07	2.2842	13 34 14.7	11.413	18	3 17 25.29	2.3949	20 45 34.0	6.178
19	1 27 8.20	2.2868	13 45 37.0	11.330	19	3 19 49.02	2.3962	20 51 40.8	6.048
20	1 29 25.49	2.2895	13 56 54.3	11.246	20	3 22 12.83	2.3973	20 57 39.8	5.918
21	1 31 42.94	2.2923	14 8 6.5	11.159	21	3 24 36.70	2.3984	21 3 31.0	5.787
22	1 34 0.56	2.2950	14 19 13.4	11.072	22	3 27 0.64	2.3995	21 9 14.3	5.655
23	1 36 18.34	2.2978	14 30 15.1	10.984	23	3 29 24.64	2.4004	21 14 49.6	5.523
24	1 38 36.29	2.3005	N. 14 41 11.5	10.894	24	3 31 48.69	2.4013	N. 21 20 17.0	5.390



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 17.					SUNDAY 19.				
0	h m s		N. 21 20 17.0	5.390	0	h m s		N. 23 2 45.1	1.088
1	3 31 48.69	2.4013	21 25 36.4	5.257	1	5 26 32.41	2.3466	23 1 36.0	1.216
2	3 34 12.79	2.4021	21 30 47.8	5.123	2	5 28 53.11	2.3434	23 0 19.2	1.343
3	3 36 36.94	2.4029	21 35 51.2	4.990	3	5 31 13.62	2.3403	22 58 54.8	1.471
4	3 39 1.14	2.4036	21 40 46.6	4.856	4	5 33 33.94	2.3370	22 57 22.7	1.598
5	3 41 25.37	2.4041	21 45 33.9	4.722	5	5 35 54.06	2.3336	22 55 43.0	1.724
6	3 43 49.63	2.4046	21 50 13.2	4.587	6	5 38 13.97	2.3302	22 53 55.8	1.850
7	3 46 13.92	2.4051	21 54 44.3	4.451	7	5 40 33.68	2.3267	22 52 1.0	1.975
8	3 48 38.24	2.4054	21 59 7.3	4.315	8	5 42 53.17	2.3231	22 49 58.8	2.099
9	3 51 2.57	2.4057	22 3 22.1	4.179	9	5 45 12.45	2.3195	22 47 49.1	2.223
10	3 53 26.92	2.4058	22 7 28.8	4.043	10	5 47 31.51	2.3158	22 45 32.1	2.345
11	3 55 51.27	2.4059	22 11 27.3	3.908	11	5 49 50.35	2.3122	22 43 7.7	2.468
12	3 58 15.63	2.4060	22 15 17.7	3.771	12	5 52 8.97	2.3083	22 40 36.0	2.589
13	4 0 39.99	2.4059	22 18 59.8	3.634	13	5 54 27.35	2.3045	22 37 57.0	2.710
14	4 3 4.34	2.4058	22 22 33.8	3.498	14	5 56 45.50	2.3006	22 35 10.8	2.829
15	4 5 28.68	2.4055	22 25 59.5	3.360	15	5 59 3.42	2.2967	22 32 17.5	2.948
16	4 7 53.00	2.4052	22 29 17.0	3.223	16	6 1 21.10	2.2926	22 29 17.0	3.067
17	4 10 17.30	2.4048	22 32 26.3	3.087	17	6 3 38.53	2.2885	22 26 9.4	3.185
18	4 12 41.58	2.4043	22 35 27.4	2.949	18	6 5 55.72	2.2844	22 22 54.8	3.302
19	4 15 5.82	2.4038	22 38 20.2	2.812	19	6 8 12.66	2.2803	22 19 33.2	3.418
20	4 17 30.03	2.4031	22 41 4.8	2.675	20	6 10 29.35	2.2761	22 16 4.7	3.533
21	4 19 54.19	2.4023	22 43 41.1	2.537	21	6 12 45.79	2.2718	22 12 29.2	3.648
22	4 22 18.30	2.4014	22 46 9.2	2.400	22	6 15 1.97	2.2675	22 8 46.9	3.762
23	4 24 42.36	2.4006	N. 22 48 29.1	2.265	23	6 17 17.89	2.2632	N. 22 4 57.8	3.874
24	4 27 6.37	2.3996				6 19 33.55	2.2588		
SATURDAY 18.					MONDAY 20.				
0	4 29 30.31	2.3984	N. 22 50 40.8	2.126	0	6 21 48.95	2.2544	N. 22 1 2.0	3.986
1	4 31 54.18	2.3972	22 52 44.2	1.989	1	6 24 4.08	2.2499	21 56 59.5	4.098
2	4 34 17.97	2.3959	22 54 39.5	1.853	2	6 26 18.94	2.2455	21 52 50.3	4.208
3	4 36 41.69	2.3947	22 56 26.5	1.715	3	6 28 33.54	2.2410	21 48 34.5	4.318
4	4 39 5.33	2.3932	22 58 5.3	1.579	4	6 30 47.86	2.2364	21 44 12.1	4.427
5	4 41 28.87	2.3915	22 59 36.0	1.443	5	6 33 1.91	2.2318	21 39 43.3	4.534
6	4 43 52.31	2.3899	23 0 58.5	1.307	6	6 35 15.68	2.2273	21 35 8.0	4.641
7	4 46 15.66	2.3883	23 2 12.8	1.170	7	6 37 29.18	2.2226	21 30 26.4	4.747
8	4 48 38.91	2.3865	23 3 18.9	1.034	8	6 39 42.39	2.2179	21 25 38.4	4.853
9	4 51 2.04	2.3846	23 4 16.9	0.899	9	6 41 55.33	2.2133	21 20 44.1	4.957
10	4 53 25.06	2.3827	23 5 6.8	0.764	10	6 44 7.99	2.2086	21 15 43.6	5.060
11	4 55 47.96	2.3806	23 5 48.6	0.629	11	6 46 20.36	2.2038	21 10 36.9	5.163
12	4 58 10.73	2.3784	23 6 22.3	0.495	12	6 48 32.45	2.1991	21 5 24.0	5.265
13	5 0 33.37	2.3762	23 6 48.0	0.361	13	6 50 44.25	2.1943	21 0 5.1	5.366
14	5 2 55.87	2.3738	23 7 5.6	0.227	14	6 52 55.77	2.1896	20 54 40.1	5.466
15	5 5 18.23	2.3713	23 7 15.2	+0.093	15	6 55 7.00	2.1848	20 49 9.2	5.564
16	5 7 40.45	2.3691	23 7 16.8	-0.040	16	6 57 17.94	2.1799	20 43 32.4	5.663
17	5 10 2.52	2.3665	23 7 10.4	0.173	17	6 59 28.59	2.1752	20 37 49.7	5.760
18	5 12 24.43	2.3639	23 6 56.1	0.304	18	7 1 38.96	2.1703	20 32 1.2	5.856
19	5 14 46.19	2.3613	23 6 33.9	0.436	19	7 3 49.03	2.1654	20 26 7.0	5.951
20	5 17 7.78	2.3584	23 6 3.8	0.568	20	7 5 58.81	2.1606	20 20 7.1	6.046
21	5 19 29.20	2.3556	23 5 25.8	0.698	21	7 8 8.30	2.1558	20 14 1.5	6.140
22	5 21 50.45	2.3527	23 4 40.1	0.828	22	7 10 17.50	2.1509	20 7 50.3	6.233
23	5 24 11.52	2.3497	23 3 46.5	0.958	23	7 12 26.41	2.1461	20 1 33.6	6.323
24	5 26 32.41	2.3466	N. 23 2 45.1	1.088	24	7 14 35.03	2.1413	N. 19 55 11.5	6.414

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 21.					THURSDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	7 14 35.03	2.1413	N. 19 55 11.5	6.414	0	8 52 3.82	1.9314	N. 13 19 25.4	9.752
1	7 16 43.36	2.1363	19 48 43.9	6.504	1	8 53 59.60	1.9279	13 9 38.8	9.802
2	7 18 51.39	2.1315	19 42 11.0	6.593	2	8 55 55.17	1.9245	12 59 49.2	9.852
3	7 20 59.14	2.1267	19 35 32.7	6.682	3	8 57 50.54	1.9212	12 49 56.6	9.900
4	7 23 6.60	2.1218	19 28 49.2	6.768	4	8 59 45.71	1.9178	12 40 1.2	9.948
5	7 25 13.76	2.1169	19 22 0.5	6.855	5	9 1 42.68	1.9145	12 30 2.9	9.994
6	7 27 20.63	2.1122	19 15 6.6	6.941	6	9 3 35.45	1.9113	12 20 1.9	10.040
7	7 29 27.22	2.1074	19 8 7.6	7.025	7	9 5 30.03	1.9081	12 9 58.1	10.086
8	7 31 33.52	2.1026	19 1 3.6	7.108	8	9 7 24.42	1.9049	11 59 51.6	10.131
9	7 33 39.53	2.0978	18 53 54.6	7.192	9	9 9 18.62	1.9018	11 49 42.4	10.176
10	7 35 45.25	2.0929	18 46 40.6	7.274	10	9 11 12.64	1.8988	11 39 30.5	10.219
11	7 37 50.68	2.0882	18 39 21.7	7.354	11	9 13 6.48	1.8958	11 29 16.1	10.261
12	7 39 55.83	2.0834	18 31 58.1	7.433	12	9 15 0.14	1.8929	11 18 59.2	10.303
13	7 42 0.69	2.0787	18 24 29.7	7.513	13	9 16 53.63	1.8900	11 8 39.7	10.345
14	7 44 5.27	2.0740	18 16 56.5	7.592	14	9 18 46.94	1.8872	10 58 17.8	10.385
15	7 46 9.57	2.0693	18 9 18.7	7.669	15	9 20 40.09	1.8844	10 47 53.5	10.425
16	7 48 13.59	2.0647	18 1 36.2	7.746	16	9 22 33.07	1.8817	10 37 26.8	10.465
17	7 50 17.33	2.0600	17 53 49.2	7.821	17	9 24 25.89	1.8791	10 26 57.7	10.504
18	7 52 20.79	2.0553	17 45 57.7	7.896	18	9 26 18.56	1.8765	10 16 26.3	10.542
19	7 54 23.97	2.0507	17 38 1.7	7.970	19	9 28 11.07	1.8739	10 5 52.7	10.579
20	7 56 26.87	2.0461	17 30 1.3	8.043	20	9 30 3.43	1.8714	9 55 16.8	10.616
21	7 58 29.50	2.0416	17 21 56.6	8.114	21	9 31 55.64	1.8690	9 44 38.8	10.652
22	8 0 31.86	2.0370	17 13 47.6	8.186	22	9 33 47.71	1.8667	9 33 58.6	10.688
23	8 2 33.94	2.0325	N. 17 5 34.3	8.257	23	9 35 39.64	1.8643	N. 9 23 16.3	10.723
WEDNESDAY 22.					FRIDAY 24.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	8 4 35.76	2.0281	N. 16 57 16.8	8.327	0	9 37 31.43	1.8621	N. 9 12 31.9	10.757
1	8 6 37.31	2.0236	16 48 55.1	8.395	1	9 39 23.09	1.8598	9 1 45.5	10.790
2	8 8 38.59	2.0192	16 40 29.4	8.462	2	9 41 14.61	1.8577	8 50 57.1	10.823
3	8 10 39.61	2.0148	16 31 59.7	8.529	3	9 43 6.01	1.8556	8 40 6.8	10.855
4	8 12 40.37	2.0104	16 23 25.9	8.597	4	9 44 57.28	1.8536	8 29 14.5	10.887
5	8 14 40.86	2.0061	16 14 48.1	8.662	5	9 46 48.44	1.8517	8 18 20.3	10.918
6	8 16 41.10	2.0018	16 6 6.5	8.726	6	9 48 39.48	1.8498	8 7 24.3	10.948
7	8 18 41.08	1.9976	15 57 21.0	8.790	7	9 50 30.41	1.8478	7 56 26.5	10.978
8	8 20 40.81	1.9934	15 48 31.7	8.853	8	9 52 21.22	1.8460	7 45 26.9	11.008
9	8 22 40.29	1.9892	15 39 38.7	8.914	9	9 54 11.93	1.8443	7 34 25.6	11.036
10	8 24 39.51	1.9850	15 30 42.0	8.976	10	9 56 2.54	1.8427	7 23 22.6	11.064
11	8 26 38.49	1.9809	15 21 41.6	9.037	11	9 57 53.05	1.8410	7 12 17.9	11.092
12	8 28 37.22	1.9768	15 12 37.6	9.096	12	9 59 43.46	1.8394	7 1 11.6	11.118
13	8 30 35.71	1.9728	15 3 30.1	9.155	13	10 1 33.78	1.8380	6 50 3.7	11.145
14	8 32 33.96	1.9688	14 54 19.0	9.213	14	10 3 24.02	1.8366	6 38 54.2	11.171
15	8 34 31.97	1.9649	14 45 4.5	9.271	15	10 5 14.17	1.8352	6 27 43.2	11.195
16	8 36 29.75	1.9611	14 35 46.5	9.328	16	10 7 4.24	1.8339	6 16 30.8	11.219
17	8 38 27.30	1.9572	14 26 25.2	9.383	17	10 8 54.24	1.8327	6 5 16.9	11.244
18	8 40 24.61	1.9533	14 17 0.5	9.438	18	10 10 44.16	1.8314	5 54 1.5	11.267
19	8 42 21.70	1.9496	14 7 32.6	9.493	19	10 12 34.01	1.8303	5 42 44.8	11.289
20	8 44 18.56	1.9458	13 58 1.4	9.546	20	10 14 23.80	1.8293	5 31 26.8	11.312
21	8 46 15.20	1.9422	13 48 27.1	9.598	21	10 16 13.52	1.8283	5 20 7.4	11.333
22	8 48 11.62	1.9386	13 38 49.6	9.651	22	10 18 3.19	1.8273	5 8 46.8	11.354
23	8 50 7.83	1.9350	13 29 9.0	9.702	23	10 19 52.80	1.8264	4 57 24.9	11.375
24	8 52 3.82	1.9314	N. 13 19 25.4	9.752	24	10 21 42.36	1.8257	N. 4 46 1.8	11.394

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 25.					MONDAY 27.				
0	10 21 42.36	1.8257	N. 4 46 1.8	11.394	0	11 49 36.22	1.8615	S. 4 32 30.8	11.645
1	10 23 31.88	1.8249	4 34 37.6	11.413	1	11 51 27.98	1.8638	4 44 9.2	11.635
2	10 25 21.35	1.8242	4 23 12.2	11.432	2	11 53 19.88	1.8663	4 55 47.0	11.624
3	10 27 10.78	1.8235	4 11 45.7	11.450	3	11 55 11.93	1.8687	5 7 24.1	11.613
4	10 29 0.17	1.8229	4 0 18.2	11.468	4	11 57 4.12	1.8712	5 19 0.5	11.600
5	10 30 49.53	1.8225	3 48 49.6	11.484	5	11 58 56.47	1.8738	5 30 36.1	11.587
6	10 32 38.87	1.8221	3 37 20.1	11.500	6	12 0 48.98	1.8764	5 42 10.9	11.573
7	10 34 28.18	1.8217	3 25 49.6	11.517	7	12 2 41.64	1.8791	5 53 44.9	11.559
8	10 36 17.47	1.8213	3 14 18.1	11.532	8	12 4 34.47	1.8819	6 5 18.0	11.545
9	10 38 6.74	1.8211	3 2 45.8	11.546	9	12 6 27.47	1.8848	6 16 50.1	11.528
10	10 39 56.00	1.8209	2 51 12.6	11.560	10	12 8 20.64	1.8877	6 28 21.3	11.511
11	10 41 45.25	1.8208	2 39 38.6	11.573	11	12 10 13.99	1.8906	6 39 51.4	11.493
12	10 43 34.50	1.8208	2 28 3.8	11.586	12	12 12 7.51	1.8936	6 51 20.5	11.475
13	10 45 23.74	1.8208	2 16 28.3	11.598	13	12 14 1.22	1.8967	7 2 48.4	11.456
14	10 47 12.99	1.8208	2 4 52.0	11.610	14	12 15 55.11	1.8998	7 14 15.2	11.437
15	10 49 2.24	1.8209	1 53 15.1	11.621	15	12 17 49.20	1.9031	7 25 40.8	11.417
16	10 50 51.50	1.8212	1 41 37.5	11.632	16	12 19 43.48	1.9063	7 37 5.2	11.395
17	10 52 40.78	1.8214	1 29 59.3	11.641	17	12 21 37.96	1.9097	7 48 28.2	11.373
18	10 54 30.07	1.8217	1 18 20.6	11.650	18	12 23 32.64	1.9131	7 59 49.9	11.350
19	10 56 19.38	1.8221	1 6 41.3	11.659	19	12 25 27.53	1.9165	8 11 10.2	11.326
20	10 58 8.72	1.8226	0 55 1.5	11.668	20	12 27 22.62	1.9200	8 22 29.0	11.302
21	10 59 58.09	1.8231	0 43 21.2	11.675	21	12 29 17.93	1.9236	8 33 46.4	11.277
22	11 1 47.49	1.8237	0 31 40.5	11.682	22	12 31 13.45	1.9272	8 45 2.2	11.250
23	11 3 36.93	1.8243	N. 0 19 59.4	11.688	23	12 33 9.19	1.9308	S. 8 56 16.4	11.223
SUNDAY 26.					TUESDAY 28.				
0	11 5 26.41	1.8251	N. 0 8 17.9	11.694	0	12 35 5.15	1.9346	S. 9 7 29.0	11.196
1	11 7 15.94	1.8258	S. 0 3 23.9	11.699	1	12 37 1.34	1.9383	9 18 39.9	11.167
2	11 9 5.51	1.8267	0 15 6.0	11.704	2	12 38 57.77	1.9424	9 29 49.0	11.137
3	11 10 55.14	1.8276	0 26 48.4	11.708	3	12 40 54.43	1.9463	9 40 56.3	11.107
4	11 12 44.82	1.8285	0 38 31.0	11.711	4	12 42 51.32	1.9503	9 52 1.8	11.076
5	11 14 34.56	1.8295	0 50 13.7	11.715	5	12 44 48.46	1.9543	10 3 5.4	11.045
6	11 16 24.36	1.8306	1 1 56.6	11.717	6	12 46 45.84	1.9584	10 14 7.0	11.010
7	11 18 14.23	1.8318	1 13 39.7	11.718	7	12 48 43.47	1.9626	10 25 6.6	10.977
8	11 20 4.18	1.8331	1 25 22.8	11.718	8	12 50 41.35	1.9668	10 36 4.2	10.942
9	11 21 54.20	1.8343	1 37 5.9	11.718	9	12 52 39.49	1.9711	10 46 59.6	10.906
10	11 23 44.30	1.8357	1 48 49.0	11.718	10	12 54 37.88	1.9754	10 57 52.9	10.870
11	11 25 34.48	1.8371	2 0 32.1	11.718	11	12 56 36.54	1.9798	11 8 44.0	10.832
12	11 27 24.75	1.8386	2 12 15.1	11.716	12	12 58 35.46	1.9843	11 19 32.7	10.793
13	11 29 15.11	1.8402	2 23 58.0	11.715	13	13 0 34.65	1.9888	11 30 19.1	10.753
14	11 31 5.57	1.8418	2 35 40.7	11.711	14	13 2 34.11	1.9933	11 41 3.1	10.713
15	11 32 56.13	1.8435	2 47 23.3	11.708	15	13 4 33.84	1.9978	11 51 44.7	10.672
16	11 34 46.79	1.8452	2 59 5.6	11.705	16	13 6 33.85	2.0025	12 2 23.7	10.629
17	11 36 37.55	1.8470	3 10 47.6	11.698	17	13 8 34.14	2.0073	12 13 0.2	10.586
18	11 38 28.43	1.8489	3 22 29.3	11.693	18	13 10 34.72	2.0120	12 23 34.0	10.542
19	11 40 19.42	1.8508	3 34 10.7	11.687	19	13 12 35.58	2.0168	12 34 5.2	10.497
20	11 42 10.53	1.8528	3 45 51.7	11.679	20	13 14 36.73	2.0216	12 44 33.6	10.450
21	11 44 1.76	1.8548	3 57 32.2	11.672	21	13 16 38.17	2.0265	12 54 59.2	10.403
22	11 45 53.11	1.8570	4 9 12.3	11.663	22	13 18 39.91	2.0315	13 5 21.9	10.354
23	11 47 44.60	1.8593	4 20 51.8	11.654	23	13 20 41.95	2.0364	13 15 41.7	10.305
24	11 49 36.22	1.8615	S. 4 32 30.8	11.645	24	13 22 44.28	2.0414	S. 13 25 58.5	10.255

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 29.					FRIDAY, DECEMBER 1.				
0	h m s		° ' "		0	h m s		° ' "	
1	13 22 44.28	2.0414	S. 13 25 58.5	10.235	15 7 8.30	2.3143	S. 20 18 49.8	6.493	
2	13 24 46.92	2.0465	13 36 12.3	10.203					
3	13 26 49.86	2.0516	13 46 22.9	10.151					
4	13 28 53.11	2.0568	13 56 30.4	10.098					
5	13 30 56.68	2.0621	14 6 34.6	10.045					
6	13 33 0.56	2.0673	14 16 35.5	9.987					
7	13 35 4.75	2.0726	14 26 33.0	9.930					
8	13 37 9.27	2.0780	14 36 27.1	9.873					
9	13 39 14.11	2.0833	14 46 17.7	9.815					
10	13 41 19.27	2.0887	14 56 4.7	9.758					
11	13 43 24.75	2.0942	15 5 48.0	9.692					
12	13 45 30.57	2.0997	15 15 27.7	9.630					
13	13 47 36.71	2.1052	15 25 3.6	9.567					
14	13 49 43.19	2.1108	15 34 35.7	9.505					
15	13 51 50.00	2.1163	15 44 3.9	9.437					
16	13 53 57.14	2.1218	15 53 28.1	9.369					
17	13 56 4.62	2.1273	16 2 48.2	9.302					
18	13 58 12.44	2.1332	16 12 4.3	9.233					
19	14 0 20.60	2.1389	16 21 16.1	9.162					
20	14 2 29.11	2.1447	16 30 23.7	9.091					
21	14 4 37.96	2.1503	16 39 27.0	9.018					
22	14 6 47.15	2.1561	16 48 25.9	8.944					
23	14 8 56.69	2.1619	16 57 20.3	8.869					
24	14 11 6.58	2.1677	S. 17 6 10.2	8.793					
THURSDAY 30.					PHASES OF THE MOON.				
0	14 13 16.81	2.1734	S. 17 14 55.4	8.715					
1	14 15 27.39	2.1793	17 23 36.0	8.637					
2	14 17 38.33	2.1853	17 32 11.8	8.557					
3	14 19 49.62	2.1911	17 40 42.8	8.476					
4	14 22 1.26	2.1969	17 49 8.9	8.393					
5	14 24 13.25	2.2028	17 57 30.0	8.310					
6	14 26 25.60	2.2088	18 5 46.1	8.225					
7	14 28 38.30	2.2147	18 13 57.0	8.139					
8	14 30 51.36	2.2206	18 22 2.8	8.053					
9	14 33 4.77	2.2264	18 30 3.3	7.965					
10	14 35 18.53	2.2323	18 37 58.5	7.875					
11	14 37 32.65	2.2383	18 45 48.3	7.784					
12	14 39 47.12	2.2442	18 53 32.6	7.692					
13	14 42 1.95	2.2501	19 1 11.4	7.599					
14	14 44 17.13	2.2560	19 8 44.5	7.504					
15	14 46 32.67	2.2619	19 16 11.9	7.408					
16	14 48 48.56	2.2678	19 23 33.5	7.312					
17	14 51 4.80	2.2737	19 30 49.3	7.213					
18	14 53 21.40	2.2796	19 37 59.1	7.114					
19	14 55 38.35	2.2854	19 45 3.0	7.014					
20	14 57 55.65	2.2912	19 52 0.8	6.912					
21	15 0 13.29	2.2969	19 58 52.4	6.809					
22	15 2 31.28	2.3028	20 5 37.9	6.705					
23	15 4 49.62	2.3085	20 12 17.0	6.599					
24	15 7 8.30	2.3143	S. 20 18 49.8	6.493					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month	Name and Direction of Object.		Noon.			P. L. of Diff.			IIIh.			P. L. of Diff.			VIh.			P. L. of Diff.			IXh.			P. L. of Diff.		
			°	'	"		°	'	"		°	'	"		°	'	"		°	'	"		°	'	"	
1	Pollux	W.	84	54	52	2893	86	27	20	2881	88	0	3	2870	89	33	0	2859								
	Regulus	W.	47	56	15	2866	49	29	17	2855	51	2	34	2842	52	36	8	2830								
	SUN	E.	23	9	31	3248	21	44	19	3242	20	19	0	3239	18	53	37	3239								
4	SUN	W.	13	3	21	3053	14	32	28	3021	16	2	15	2993	17	32	36	2970								
	α Aquilæ	E.	70	7	3	3117	68	39	14	3120	67	11	29	3124	65	43	49	3130								
	Fomalhaut	E.	96	22	23	3052	94	53	14	3040	93	23	51	3030	91	54	15	3019								
	α Pegasi	E.	116	30	40	2750	114	55	6	2737	113	19	15	2723	111	43	6	2711								
5	SUN	W.	25	10	41	2887	26	43	17	2874	28	16	9	2862	29	49	16	2851								
	α Aquilæ	E.	58	27	58	3188	57	1	34	3206	55	35	32	3227	54	9	55	3252								
	Fomalhaut	E.	84	23	32	2984	82	52	59	2979	81	22	20	2976	79	51	37	2973								
	α Pegasi	E.	103	38	24	2655	102	0	44	2645	100	22	50	2636	98	44	44	2627								
6	SUN	W.	37	38	14	2803	39	12	38	2795	40	47	13	2787	42	21	58	2779								
	VENUS	W.	24	25	21	2887	25	57	56	2879	27	30	42	2869	29	3	40	2862								
	MARS	W.	19	10	58	2697	20	47	42	2689	22	24	36	2681	24	1	41	2674								
	Fomalhaut	E.	72	17	42	2977	70	47	0	2981	69	16	24	2987	67	45	55	2995								
	α Pegasi	E.	90	31	22	2588	88	52	11	2582	87	12	51	2576	85	33	23	2570								
7	SUN	W.	50	18	13	2744	51	53	55	2737	53	29	46	2731	55	5	45	2724								
	VENUS	W.	36	51	5	2823	38	25	3	2817	39	59	9	2810	41	33	24	2803								
	MARS	W.	32	9	29	2640	33	47	29	2635	35	25	37	2628	37	3	54	2623								
	Antares	W.	27	25	23	2439	29	8	2	2430	30	50	54	2422	32	33	58	2414								
	Fomalhaut	E.	60	16	30	3058	58	47	29	3076	57	18	50	3097	55	50	37	3122								
	α Pegasi	E.	77	14	14	2547	75	34	6	2544	73	53	54	2541	72	13	38	2539								
	α Arietis	E.	120	18	24	2439	118	35	45	2432	116	52	56	2426	115	9	58	2420								
8	SUN	W.	63	7	40	2696	64	44	25	2691	66	21	17	2686	67	58	16	2681								
	VENUS	W.	49	26	40	2775	51	1	41	2769	52	36	50	2764	54	12	5	2759								
	MARS	W.	45	17	9	2596	46	56	10	2591	48	35	17	2587	50	14	30	2582								
	Antares	W.	41	11	52	2381	42	55	54	2375	44	40	4	2370	46	24	22	2364								
	SATURN	W.	27	24	7	2398	29	7	44	2394	30	51	28	2389	32	35	19	2384								
	α Pegasi	E.	63	51	43	2535	62	11	18	2536	60	30	55	2538	58	50	34	2539								
	α Arietis	E.	106	33	3	2392	104	49	17	2387	103	5	23	2382	101	21	22	2378								
9	SUN	W.	76	4	47	2658	77	42	23	2654	79	20	5	2649	80	57	53	2646								
	VENUS	W.	62	9	59	2735	63	45	52	2731	65	21	51	2726	66	57	56	2722								
	MARS	W.	58	32	11	2560	60	12	1	2556	61	51	57	2552	63	31	58	2548								
	Antares	W.	55	7	42	2341	56	52	42	2337	58	37	48	2333	60	23	0	2328								
	SATURN	W.	41	16	8	2363	43	0	36	2359	44	45	9	2355	46	29	48	2352								
	α Pegasi	E.	50	30	3	2567	48	50	23	2576	47	10	55	2577	45	31	42	2601								
	α Arietis	E.	92	39	42	2356	90	55	4	2352	89	10	20	2348	87	25	31	2345								
	Aldebaran	E.	125	36	3	2372	123	51	48	2366	122	7	25	2362	120	22	55	2356								
10	SUN	W.	89	8	10	2627	90	46	28	2624	92	24	50	2621	94	3	17	2618								
	VENUS	W.	74	59	38	2704	76	36	13	2700	78	12	53	2697	79	49	37	2693								
	MARS	W.	71	53	19	2530	73	33	50	2527	75	14	25	2525	76	55	4	2522								
	Antares	W.	69	10	24	2311	70	56	8	2307	72	41	57	2304	74	27	50	2301								
	SATURN	W.	55	14	20	2335	56	59	29	2332	58	44	42	2329	60	29	59	2326								
	α Arietis	E.	78	40	12	2329	76	54	55	2326	75	9	34	2324	73	24	10	2322								
	Aldebaran	E.	111	38	40	2335	109	53	31	2331	108	8	16	2327	106	22	56	2324								

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	Pollux	W.	91 6 11	2848	92 39 36	2838	94 13 15	2827	95 47 8	2817
	Regulus	W.	54 9 57	2818	55 44 2	2806	57 18 22	2795	58 52 57	2782
	SUN	E.	17 28 14	3241	16 2 53	3246	14 37 38	3256	13 12 35	3274
4	SUN	W.	19 3 26	2950	20 34 42	2931	22 6 22	2915	23 38 22	2900
	α Aquilæ	E.	64 16 16	3138	62 48 52	3148	61 21 40	3158	59 54 41	3172
	Fomalhaut	E.	90 24 26	3011	88 54 27	3002	87 24 17	2995	85 53 58	2989
	α Pegasi	E.	110 6 41	2698	108 29 59	2687	106 53 2	2676	105 15 50	2666
5	SUN	W.	31 22 38	2841	32 56 13	2831	34 30 1	2821	36 4 1	2811
	α Aquilæ	E.	52 44 47	3280	51 20 12	3311	49 56 13	3346	48 32 55	3387
	Fomalhaut	E.	78 20 51	2972	76 50 3	2972	75 19 15	2973	73 48 28	2973
	α Pegasi	E.	97 6 26	2618	95 27 56	2610	93 49 15	2603	92 10 24	2595
6	SUN	W.	43 56 54	2771	45 32 0	2764	47 7 15	2756	48 42 40	2750
	VENUS	W.	30 36 48	2853	32 10 7	2845	33 43 37	2838	35 17 16	2830
	MARS	W.	25 38 56	2666	27 16 21	2660	28 53 55	2653	30 31 38	2647
	Fomalhaut	E.	66 15 36	3003	64 45 27	3014	63 15 32	3026	61 45 52	3041
	α Pegasi	E.	83 53 47	2564	82 14 3	2560	80 34 13	2555	78 54 16	2551
7	SUN	W.	56 41 53	2719	58 18 8	2713	59 54 31	2707	61 31 2	2701
	VENUS	W.	43 7 48	2797	44 42 20	2792	46 16 59	2785	47 51 46	2780
	MARS	W.	38 42 18	2617	40 20 50	2612	41 59 29	2607	43 38 15	2601
	Antares	W.	34 17 13	2406	36 0 39	2400	37 44 14	2393	39 27 59	2387
	Fomalhaut	E.	54 22 54	3149	52 55 44	3180	51 29 11	3215	50 3 20	3257
	α Pegasi	E.	70 33 19	2537	68 52 57	2535	67 12 33	2535	65 32 8	2535
	α Arietis	E.	113 26 52	2414	111 43 37	2408	110 0 13	2403	108 16 42	2397
8	SUN	W.	69 35 22	2676	71 12 34	2672	72 49 52	2666	74 27 17	2663
	VENUS	W.	55 47 27	2753	57 22 56	2749	58 58 31	2744	60 34 12	2740
	MARS	W.	51 53 50	2577	53 33 16	2573	55 12 48	2568	56 52 27	2564
	Antares	W.	48 8 48	2359	49 53 21	2355	51 38 1	2350	53 22 48	2345
	SATURN	W.	34 19 16	2380	36 3 20	2375	37 47 30	2371	39 31 46	2367
	α Pegasi	E.	57 10 15	2543	55 30 1	2548	53 49 54	2553	52 9 54	2559
	α Arietis	E.	99 37 15	2373	97 53 1	2368	96 8 41	2364	94 24 14	2360
9	SUN	W.	82 35 46	2642	84 13 44	2638	85 51 48	2634	87 29 57	2631
	VENUS	W.	68 34 6	2719	70 10 21	2714	71 46 42	2710	73 23 8	2707
	MARS	W.	65 12 4	2544	66 52 16	2541	68 32 32	2538	70 12 53	2534
	Antares	W.	62 8 18	2384	63 53 42	2381	65 39 11	2377	67 24 45	2374
	SATURN	W.	48 14 32	2348	49 59 21	2344	51 44 16	2341	53 29 16	2338
	α Pegasi	E.	43 52 48	2615	42 14 14	2633	40 36 4	2653	38 58 21	2678
	α Arietis	E.	85 40 37	2342	83 55 38	2338	82 10 34	2335	80 25 25	2332
	Aldebaran	E.	118 38 17	2351	116 53 32	2347	115 8 41	2343	113 23 44	2338
10	SUN	W.	95 41 48	2612	97 20 23	2612	98 59 1	2610	100 37 43	2607
	VENUS	W.	81 26 26	2690	83 3 19	2688	84 40 15	2685	86 17 15	2682
	MARS	W.	78 35 47	2519	80 16 34	2516	81 57 25	2514	83 38 19	2511
	Antares	W.	76 13 48	2299	77 59 49	2296	79 45 55	2294	81 32 4	2291
	SATURN	W.	62 15 21	2323	64 0 47	2321	65 46 16	2318	67 31 49	2316
	α Arietis	E.	71 38 43	2320	69 53 13	2318	68 7 40	2316	66 22 4	2315
	Aldebaran	E.	104 37 31	2321	102 52 2	2317	101 6 28	2315	99 20 50	2312

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## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
11	SUN W.	102 16 29	2605	103 55 17	2602	105 34 9	2600	107 13 4	2599
	VENUS W.	87 54 19	2680	89 31 26	2678	91 8 36	2675	92 45 49	2674
	MARS W.	85 19 17	2509	87 0 18	2507	88 41 22	2504	90 22 29	2503
	SATURN W.	69 17 25	2314	71 3 4	2311	72 48 47	2310	74 34 32	2308
	α Aquilæ W.	38 1 43	2741	39 17 47	2630	40 35 49	2533	41 55 37	2446
	α Arietis E.	64 36 26	2313	62 50 46	2313	61 5 5	2312	59 19 23	2311
	Aldebaran E.	97 35 8	2310	95 49 23	2307	94 3 34	2306	92 17 43	2304
12	SUN W.	115 28 9	2592	117 7 15	2592	118 46 21	2592	120 25 27	2591
	MARS W.	98 48 35	2497	100 29 53	2497	102 11 11	2496	103 52 30	2495
	SATURN W.	83 23 51	2302	85 9 48	2302	86 55 45	2301	88 41 43	2301
	α Aquilæ W.	48 55 56	2135	50 23 23	2090	51 51 45	2050	53 20 56	2015
	α Arietis E.	50 30 53	2313	48 45 16	2317	46 59 41	2320	45 14 10	2322
	Aldebaran E.	83 27 54	2298	81 41 52	2298	79 55 50	2298	78 9 47	2298
13	SATURN W.	97 31 28	2304	99 17 22	2306	101 3 13	2307	102 49 2	2309
	α Aquilæ W.	60 56 30	2884	62 29 9	2866	64 2 11	2850	65 35 34	2836
	α Arietis E.	36 28 1	2350	34 43 14	2358	32 58 39	2368	31 14 19	2382
	Aldebaran E.	69 19 48	2304	67 33 54	2307	65 48 4	2309	64 2 17	2312
	Pollux E.	111 9 47	2337	109 24 41	2337	107 39 36	2337	105 54 31	2339
14	α Aquilæ W.	73 26 17	2791	75 0 57	2787	76 35 42	2784	78 10 31	2782
	Fomalhaut W.	48 17 57	3189	49 44 19	3147	51 11 32	3110	52 39 30	3076
	Aldebaran E.	55 14 42	2333	53 29 31	2339	51 44 28	2346	49 59 35	2353
	Pollux E.	97 9 39	2349	95 24 51	2353	93 40 8	2357	91 55 31	2361
15	α Aquilæ W.	86 4 42	2792	87 39 21	2796	89 13 54	2803	90 48 18	2810
	Fomalhaut W.	60 7 59	2965	61 38 56	2950	63 10 12	2938	64 41 43	2928
	α Pegasi W.	38 21 17	2687	39 58 15	2666	41 35 40	2651	43 13 26	2640
	Aldebaran E.	41 18 0	2398	39 34 23	2410	37 51 2	2423	36 8 0	2437
	Pollux E.	83 14 12	2389	81 30 22	2397	79 46 43	2404	78 3 14	2412
16	α Aquilæ W.	98 37 23	2866	100 10 26	2880	101 43 11	2895	103 15 36	2912
	Fomalhaut W.	72 21 33	2907	73 53 43	2908	75 25 52	2909	76 57 59	2912
	α Pegasi W.	51 25 14	2612	53 3 53	2611	54 42 33	2612	56 21 12	2614
	Pollux E.	69 28 56	2460	67 46 46	2472	66 4 52	2482	64 23 14	2494
	Regulus E.	106 15 7	2412	104 31 50	2422	102 48 46	2431	101 5 55	2440
17	Fomalhaut W.	84 37 7	2945	86 8 29	2955	87 39 38	2965	89 10 34	2977
	α Pegasi W.	64 33 17	2638	66 11 20	2646	67 49 12	2655	69 26 53	2663
	Pollux E.	55 59 28	2562	54 19 41	2578	52 40 16	2594	51 1 13	2610
	Regulus E.	92 35 13	2494	90 53 51	2505	89 12 45	2517	87 31 56	2529
18	Fomalhaut W.	96 41 11	3050	98 10 22	3067	99 39 12	3085	101 7 40	3104
	α Pegasi W.	77 32 12	2713	79 8 34	2725	80 44 40	2738	82 20 30	2750
	α Arietis W.	33 58 20	2656	35 35 59	2663	37 13 29	2670	38 50 49	2678
	Pollux E.	42 51 58	2707	41 15 27	2729	39 39 25	2752	38 3 54	2778
	Regulus E.	79 12 7	2593	77 33 3	2607	75 54 17	2621	74 15 50	2634
19	α Pegasi W.	90 15 28	2816	91 49 35	2830	93 23 24	2845	94 56 54	2859
	α Arietis W.	46 54 20	2730	48 30 20	2742	50 6 4	2753	51 41 33	2765
	Regulus E.	66 8 15	2704	64 31 41	2719	62 55 27	2734	61 19 32	2748

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Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
11	SUN W.	108 52 1	2596	110 31 1	2596	112 10 2	2594	113 49 5	2593
	VENUS W.	94 23 4	2672	96 0 22	2670	97 37 42	2669	99 15 4	2668
	MARS W.	92 3 38	2501	93 44 50	2500	95 26 3	2499	97 7 18	2497
	SATURN W.	76 20 20	2307	78 6 10	2305	79 52 2	2304	81 37 56	2303
	α Aquilæ W.	43 17 1	2370	44 39 52	2300	46 4 4	2328	47 29 28	2324
	α Arietis E.	57 33 40	2311	55 47 57	2311	54 2 14	2313	52 16 33	2313
	Aldebaran E.	90 31 49	2302	88 45 53	2301	86 59 55	2300	85 13 55	2299
12	SUN W.	122 4 34	2592	123 43 40	2592	125 22 46	2593	127 1 51	2595
	MARS W.	105 33 50	2496	107 15 9	2496	108 56 28	2497	110 37 46	2497
	SATURN W.	90 27 41	2301	92 13 39	2302	93 59 36	2302	95 45 33	2303
	α Aquilæ W.	54 50 50	2983	56 21 24	2954	57 52 35	2928	59 24 18	2905
	α Arietis E.	43 28 43	2326	41 43 22	2331	39 58 7	2336	38 13 0	2342
	Aldebaran E.	76 23 45	2298	74 37 43	2300	72 51 43	2300	71 5 44	2302
13	SATURN W.	104 34 48	2311	106 20 31	2314	108 6 10	2317	109 51 45	2320
	α Aquilæ W.	67 9 15	2824	68 43 12	2813	70 17 23	2805	71 51 45	2797
	α Arietis E.	29 30 18	2396	27 46 38	2413	26 3 22	2433	24 20 35	2457
	Aldebaran E.	62 16 35	2315	60 30 58	2319	58 45 26	2324	57 0 1	2328
	Pollux E.	104 9 28	2339	102 24 26	2342	100 39 27	2344	98 54 31	2346
14	α Aquilæ W.	79 45 23	2782	81 20 15	2782	82 55 7	2783	84 29 57	2787
	Fomalhaut W.	54 8 9	3047	55 37 23	3022	57 7 9	3000	58 37 22	2981
	Aldebaran E.	48 14 52	2360	46 30 20	2368	44 46 0	2378	43 1 53	2387
	Pollux E.	90 11 0	2366	88 26 36	2371	86 42 19	2377	84 58 11	2383
15	α Aquilæ W.	92 22 33	2819	93 56 36	2820	95 30 26	2840	97 4 2	2852
	Fomalhaut W.	66 13 26	2920	67 45 19	2915	69 17 19	2911	70 49 24	2908
	α Pegasi W.	44 51 27	2630	46 29 41	2622	48 8 6	2617	49 46 38	2614
	Aldebaran E.	34 25 18	2453	32 42 58	2470	31 1 3	2489	29 19 35	2510
	Pollux E.	76 19 57	2421	74 36 52	2430	72 54 0	2439	71 11 21	2449
16	α Aquilæ W.	104 47 40	2930	106 19 21	2930	107 50 37	2970	109 21 27	2992
	Fomalhaut W.	78 30 3	2916	80 2 1	2922	81 33 52	2920	83 5 34	2936
	α Pegasi W.	57 59 48	2617	59 38 20	2621	61 16 46	2626	62 55 5	2632
	Pollux E.	62 41 52	2507	61 0 48	2520	59 20 2	2533	57 39 35	2548
	Regulus E.	99 23 17	2450	97 40 54	2460	95 58 45	2471	94 16 51	2482
17	Fomalhaut W.	90 41 15	2990	92 11 40	3003	93 41 49	3018	95 11 40	3034
	α Pegasi W.	71 4 23	2672	72 41 40	2681	74 18 45	2692	75 55 36	2703
	Pollux E.	49 22 32	2628	47 44 15	2647	46 6 24	2666	44 28 58	2685
	Regulus E.	85 51 23	2542	84 11 8	2554	82 31 10	2567	80 51 30	2580
18	Fomalhaut W.	102 35 45	3124	104 3 26	3145	105 30 41	3167	106 57 30	3188
	α Pegasi W.	83 56 4	2763	85 31 21	2775	87 6 21	2789	88 41 3	2802
	α Arietis W.	40 27 58	2688	42 4 54	2698	43 41 37	2708	45 18 6	2719
	Pollux E.	36 28 57	2805	34 54 35	2833	33 20 50	2864	31 47 45	2898
	Regulus E.	72 37 41	2648	70 59 51	2662	69 22 20	2676	67 45 8	2690
19	α Pegasi W.	96 30 6	2873	98 2 59	2887	99 35 34	2902	101 7 50	2918
	α Arietis W.	53 16 47	2777	54 51 45	2789	56 26 27	2801	58 0 53	2813
	Regulus E.	59 43 56	2763	58 8 39	2777	56 33 41	2792	54 59 2	2807



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Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
20	α Pegasi W.	102 39 46	2933	104 11 23	2948	105 42 41	2963	107 13 40	2979
	α Arietis W.	59 35 4	2826	61 8 58	2838	62 42 37	2850	64 16 0	2862
	Aldebaran W.	26 55 20	2924	28 27 8	2926	29 58 54	2928	31 30 37	2931
	Regulus E.	53 24 43	2821	51 50 42	2835	50 17 0	2850	48 43 37	2865
	Spica E.	107 19 17	2795	105 44 43	2808	104 10 26	2821	102 36 26	2834
21	α Arietis W.	71 59 5	2920	73 30 58	2932	75 2 36	2943	76 34 0	2954
	Aldebaran W.	39 7 43	2962	40 38 44	2969	42 9 35	2977	43 40 17	2984
	Regulus E.	41 1 23	2938	39 29 52	2952	37 58 39	2967	36 27 45	2981
	Spica E.	94 50 30	2896	93 18 6	2908	91 45 57	2919	90 14 2	2930
	SUN E.	131 26 7	3267	130 1 17	3280	128 36 42	3292	127 12 21	3303
22	α Arietis W.	84 7 48	3003	85 37 57	3012	87 7 55	3020	88 37 43	3029
	Aldebaran W.	51 11 23	3023	52 41 7	3030	54 10 43	3037	55 40 10	3043
	Spica E.	82 37 49	2981	81 7 12	2989	79 36 46	2998	78 6 31	3007
	SUN E.	120 13 54	3358	118 50 49	3368	117 27 56	3377	116 5 13	3386
23	α Arietis W.	96 4 15	3065	97 33 8	3070	99 1 54	3076	100 30 33	3081
	Aldebaran W.	63 5 27	3073	64 34 9	3078	66 2 45	3082	67 31 16	3087
	Spica E.	70 37 43	3042	69 8 22	3048	67 39 9	3053	66 10 2	3059
	SUN E.	109 14 3	3423	107 52 13	3431	106 30 31	3436	105 8 55	3441
24	Aldebaran W.	74 52 46	3101	76 20 55	3102	77 49 2	3104	79 17 7	3104
	Pollux W.	33 42 10	3261	35 7 7	3248	36 32 19	3237	37 57 44	3228
	Spica E.	58 45 49	3075	57 17 10	3078	55 48 34	3079	54 19 59	3081
	SUN E.	98 22 11	3459	97 1 1	3462	95 39 54	3463	94 18 48	3464
25	Aldebaran W.	86 37 34	3100	88 5 44	3098	89 33 56	3096	91 2 11	3092
	Pollux W.	45 7 24	3188	46 33 48	3179	48 0 22	3173	49 27 4	3164
	Spica E.	46 57 15	3079	45 28 40	3078	44 0 3	3075	42 31 23	3073
	SUN E.	87 33 24	3460	86 12 15	3458	84 51 4	3455	83 29 50	3452
26	Aldebaran W.	98 24 34	3070	99 53 20	3065	101 22 12	3059	102 51 12	3052
	Pollux W.	56 42 57	3124	58 10 37	3115	59 38 28	3107	61 6 29	3097
	Spica E.	35 7 6	3053	33 37 59	3048	32 8 46	3043	30 39 26	3038
	SUN E.	76 42 29	3427	75 20 43	3420	73 58 49	3414	72 36 48	3406
27	Pollux W.	68 29 30	3048	69 58 43	3038	71 28 9	3026	72 57 49	3015
	Regulus W.	31 27 29	3048	32 56 42	3034	34 26 13	3019	35 56 2	3005
	SUN E.	65 44 21	3361	64 21 20	3351	62 58 7	3339	61 34 41	3329
28	Pollux W.	80 29 44	2955	82 0 53	2943	83 32 17	2930	85 3 58	2917
	Regulus W.	43 29 32	2935	45 1 7	2920	46 33 0	2906	48 5 11	2891
	SUN E.	54 34 13	3268	53 9 24	3254	51 44 19	3242	50 18 59	3227
29	Pollux W.	92 46 31	2851	94 19 53	2837	95 53 33	2823	97 27 31	2810
	Regulus W.	55 50 45	2819	57 24 48	2804	58 59 11	2789	60 33 53	2774
	SUN E.	43 8 6	3155	41 41 3	3140	40 13 42	3125	38 46 3	3110
30	Pollux W.	105 21 46	2742	106 57 30	2729	108 33 32	2715	110 9 52	2702
	Regulus W.	68 32 19	2699	70 9 0	2685	71 46 0	2670	73 23 20	2655
	SUN E.	31 23 6	3033	29 53 34	3017	28 23 42	3002	26 53 32	2986

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Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
20	α Pegasi W.	108 44 19	2994	110 14 39	3020	111 44 39	3026	113 14 20	3048
	α Arietis W.	65 49 8	2874	67 22 0	2886	68 54 37	2898	70 26 58	2909
	Aldebaran W.	33 2 16	2936	34 33 49	2942	36 5 15	2948	37 36 33	2954
	Regulus E.	47 10 33	2880	45 37 48	2894	44 5 21	2909	42 33 13	2923
	Spica E.	101 2 42	2847	99 29 15	2859	97 56 4	2872	96 23 9	2884
21	α Arietis W.	78 5 11	2964	79 36 9	2974	81 6 54	2984	82 37 27	2993
	Aldebaran W.	45 10 50	2992	46 41 13	3000	48 11 26	3008	49 41 29	3015
	Regulus E.	34 57 9	2997	33 26 53	3013	31 56 56	3029	30 27 19	3045
	Spica E.	88 42 21	2941	87 10 54	2951	85 39 40	2961	84 8 38	2971
	SUN E.	125 48 13	3315	124 24 19	3326	123 0 38	3338	121 37 10	3348
22	α Arietis W.	90 7 20	3037	91 36 47	3044	93 6 5	3052	94 35 14	3058
	Aldebaran W.	57 9 29	3050	58 38 40	3056	60 7 43	3063	61 36 38	3068
	Spica E.	76 36 27	3024	75 6 32	3022	73 36 47	3030	72 7 11	3036
	SUN E.	114 42 41	3394	113 20 18	3403	111 58 5	3410	110 36 0	3417
23	α Arietis W.	101 59 6	3085	103 27 34	3090	104 55 56	3093	106 24 14	3097
	Aldebaran W.	68 59 42	3090	70 28 4	3094	71 56 21	3096	73 24 35	3099
	Spica E.	64 41 2	3063	63 12 7	3067	61 43 17	3070	60 14 31	3073
	SUN E.	103 47 25	3446	102 26 0	3450	101 4 40	3454	99 43 24	3456
24	Aldebaran W.	80 45 12	3105	82 13 16	3104	83 41 21	3103	85 9 27	3102
	Pollux W.	39 23 20	3220	40 49 6	3210	42 15 3	3203	43 41 9	3195
	Spica E.	52 51 26	3081	51 22 53	3082	49 54 21	3081	48 25 48	3081
	SUN E.	92 57 44	3464	91 36 40	3464	90 15 36	3463	88 54 31	3462
25	Aldebaran W.	92 30 30	3089	93 58 53	3085	95 27 21	3080	96 55 55	3076
	Pollux W.	50 53 56	3157	52 20 57	3149	53 48 7	3141	55 15 27	3133
	Spica E.	41 2 40	3070	39 33 54	3066	38 5 3	3062	36 36 7	3058
	SUN E.	82 8 32	3448	80 47 10	3443	79 25 42	3438	78 4 9	3432
26	Aldebaran W.	104 20 21	3045	105 49 38	3038	107 19 4	3030	108 48 40	3022
	Pollux W.	62 34 42	3088	64 3 6	3078	65 31 42	3069	67 0 30	3059
	Spica E.	29 10 0	3032	27 40 27	3026	26 10 46	3020	24 40 58	3013
	SUN E.	71 14 38	3398	69 52 19	3389	68 29 50	3380	67 7 11	3371
27	Pollux W.	74 27 43	3004	75 57 51	2992	77 28 14	2981	78 58 51	2968
	Regulus W.	37 26 9	2991	38 56 33	2977	40 27 15	2962	41 58 15	2949
	SUN E.	60 11 3	3317	58 47 11	3306	57 23 6	3294	55 58 47	3281
28	Pollux W.	86 35 55	2904	88 8 9	2891	89 40 39	2878	91 13 26	2864
	Regulus W.	49 37 41	2877	51 10 29	2863	52 43 35	2848	54 17 1	2834
	SUN E.	48 53 22	3214	47 27 29	3199	46 1 19	3184	44 34 51	3170
29	Pollux W.	99 1 46	2796	100 36 19	2782	102 11 10	2769	103 46 19	2755
	Regulus W.	62 8 55	2760	63 44 16	2744	65 19 57	2729	66 55 58	2714
	SUN E.	37 18 5	3094	35 49 48	3079	34 21 13	3064	32 52 19	3048
30	Pollux W.	111 46 29	2689	113 23 23	2677	115 0 34	2665	116 38 1	2652
	Regulus W.	75 1 0	2640	76 39 0	2626	78 17 20	2612	79 55 59	2597
	SUN E.	25 23 2	2971	23 52 13	2956	22 21 5	2941	20 49 38	2926

## AT GREENWICH APPARENT NOON.

AT GREENWICH APPARENT NOON.										
Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Added to Apparent Time.			
Frid.	1	<sup>h</sup> 16 <sup>m</sup> 29 <sup>s</sup> 38.10	10.805	S. <sup>°</sup> 21 <sup>'</sup> 49 <sup>"</sup> 38.6	-23.26	16 15.91	70.27	<sup>m</sup> 10 <sup>s</sup> 50.27	0.945	
Sat.	2	16 33 57.73	10.832	21 58 44.4	22.21	16 16.06	70.36	10 27.26	0.971	
SUN.	3	16 38 17.99	10.857	22 7 24.8	21.15	16 16.21	70.44	10 3.63	0.997	
Mon.	4	16 42 38.85	10.881	22 15 39.6	-20.07	16 16.35	70.52	9 39.40	1.021	
Tues.	5	16 47 0.27	10.904	22 23 28.3	18.98	16 16.49	70.60	9 14.60	1.044	
Wed.	6	16 51 22.22	10.925	22 30 50.9	17.88	16 16.63	70.67	8 49.27	1.065	
Thur.	7	16 55 44.69	10.946	22 37 47.1	-16.78	16 16.76	70.74	8 23.43	1.086	
Frid.	8	17 0 7.64	10.965	22 44 16.6	15.67	16 16.89	70.81	7 57.12	1.105	
Sat.	9	17 4 31.03	10.983	22 50 19.4	14.55	16 17.01	70.87	7 30.36	1.122	
SUN.	10	17 8 54.84	11.000	22 55 55.0	-13.42	16 17.13	70.93	7 3.17	1.139	
Mon.	11	17 13 19.04	11.016	23 1 3.5	12.28	16 17.25	70.98	6 35.61	1.156	
Tues.	12	17 17 43.60	11.030	23 5 44.6	11.14	16 17.36	71.03	6 7.68	1.171	
Wed.	13	17 22 8.49	11.043	23 9 58.2	-9.99	16 17.46	71.07	5 39.43	1.184	
Thur.	14	17 26 33.69	11.055	23 13 44.2	8.84	16 17.56	71.11	5 10.87	1.196	
Frid.	15	17 30 59.15	11.066	23 17 2.3	7.68	16 17.66	71.14	4 42.04	1.206	
Sat.	16	17 35 24.86	11.075	23 19 52.6	-6.52	16 17.75	71.17	4 12.97	1.215	
SUN.	17	17 39 50.78	11.084	23 22 14.8	5.34	16 17.83	71.20	3 43.69	1.224	
Mon.	18	17 44 16.89	11.091	23 24 9.0	4.17	16 17.90	71.23	3 14.22	1.231	
Tues.	19	17 48 43.16	11.097	23 25 35.0	-2.99	16 17.97	71.25	2 44.59	1.237	
Wed.	20	17 53 9.55	11.102	23 26 32.8	1.81	16 18.03	71.26	2 14.84	1.242	
Thur.	21	17 57 36.04	11.105	23 27 2.2	-0.64	16 18.09	71.27	1 44.99	1.245	
Frid.	22	18 2 2.59	11.107	23 27 3.4	+0.54	16 18.14	71.27	1 15.07	1.247	
Sat.	23	18 6 29.18	11.108	23 26 36.2	1.72	16 18.18	71.27	0 45.13	1.248	
SUN.	24	18 10 55.76	11.107	23 25 40.7	2.90	16 18.22	71.26	0 15.18	1.247	
Mon.	25	18 15 22.32	11.105	23 24 16.9	+4.08	16 18.26	71.25	0 14.74	1.245	
Tues.	26	18 19 48.81	11.101	23 22 24.8	5.26	16 18.29	71.24	0 44.58	1.242	
Wed.	27	18 24 15.20	11.096	23 20 4.5	6.43	16 18.31	71.22	1 14.33	1.237	
Thur.	28	18 28 41.44	11.090	23 17 15.9	+7.60	16 18.33	71.20	1 43.94	1.230	
Frid.	29	18 33 7.51	11.082	23 13 59.3	8.77	16 18.35	71.17	2 13.37	1.222	
Sat.	30	18 37 33.37	11.072	23 10 14.7	9.94	16 18.36	71.14	2 42.59	1.212	
SUN.	31	18 41 58.98	11.061	23 6 2.2	11.10	16 18.37	71.10	3 11.56	1.201	
Mon.	32	18 46 24.31	11.049	S. 23 1 22.2	+12.25	16 18.38	71.06	3 40.26	1.189	

NOTE.—The mean time of semidiameter passing may be found by subtracting 0<sup>s</sup>.19 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing;

The sign + indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Subtracted from Mean Time.		
Frid.	1	<sup>h</sup> 16 <sup>m</sup> 29 <sup>s</sup> 40.05	10.802	S. 21 49 42.7	-23.25	<sup>m</sup> 10 <sup>s</sup> 50.11	0.945	<sup>h</sup> 16 <sup>m</sup> 40 <sup>s</sup> 30.16
Sat.	2	16 33 59.62	10.828	21 58 48.3	22.20	10 27.10	0.971	16 44 26.72
SUN.	3	16 38 19.81	10.854	22 7 28.3	21.14	10 3.46	0.997	16 48 23.27
Mon.	4	16 42 40.60	10.878	22 15 42.8	-20.06	9 39.23	1.021	16 52 19.83
Tues.	5	16 47 1.95	10.901	22 23 31.2	18.97	9 14.44	1.044	16 56 16.39
Wed.	6	16 51 23.83	10.923	22 30 53.5	17.87	8 49.11	1.065	17 0 12.94
Thur.	7	16 55 46.22	10.943	22 37 49.4	-16.77	8 23.28	1.086	17 4 9.50
Frid.	8	17 0 9.09	10.962	22 44 18.7	15.66	7 56.97	1.106	17 8 6.06
Sat.	9	17 4 32.41	10.980	22 50 21.2	14.54	7 30.22	1.124	17 12 2.62
SUN.	10	17 8 56.13	10.996	22 55 56.6	-13.41	7 3.04	1.141	17 15 59.18
Mon.	11	17 13 20.25	11.012	23 1 4.9	12.27	6 35.48	1.156	17 19 55.73
Tues.	12	17 17 44.73	11.027	23 5 45.8	11.13	6 7.56	1.170	17 23 52.29
Wed.	13	17 22 9.53	11.040	23 9 59.2	-9.98	5 39.32	1.183	17 27 48.85
Thur.	14	17 26 34.64	11.052	23 13 44.9	8.83	5 10.76	1.195	17 31 45.41
Frid.	15	17 31 0.02	11.062	23 17 3.0	7.67	4 41.95	1.206	17 35 41.96
Sat.	16	17 35 25.64	11.071	23 19 53.0	-6.51	4 12.89	1.216	17 39 38.52
SUN.	17	17 39 51.47	11.080	23 22 15.2	5.34	3 43.61	1.224	17 43 35.08
Mon.	18	17 44 17.49	11.087	23 24 9.2	4.17	3 14.15	1.231	17 47 31.64
Tues.	19	17 48 43.66	11.093	23 25 35.1	-2.99	2 44.53	1.237	17 51 28.20
Wed.	20	17 53 9.96	11.098	23 26 32.8	1.81	2 14.79	1.242	17 55 24.76
Thur.	21	17 57 36.36	11.101	23 27 2.2	-0.64	1 44.95	1.245	17 59 21.31
Frid.	22	18 2 2.82	11.103	23 27 3.4	+0.54	1 15.05	1.247	18 3 17.87
Sat.	23	18 6 29.31	11.104	23 26 36.2	1.72	0 45.11	1.247	18 7 14.43
SUN.	24	18 10 55.81	11.103	23 25 40.7	2.90	0 15.18	1.246	18 11 10.99
Mon.	25	18 15 22.27	11.101	23 24 16.9	+4.08	0 14.73	1.245	18 15 7.54
Tues.	26	18 19 48.67	11.098	23 22 24.9	5.26	0 44.57	1.241	18 19 4.10
Wed.	27	18 24 14.96	11.093	23 20 4.6	6.43	1 14.30	1.236	18 23 0.66
Thur.	28	18 28 41.12	11.086	23 17 16.2	+7.60	1 43.90	1.230	18 26 57.22
Frid.	29	18 33 7.10	11.078	23 13 59.7	8.77	2 13.32	1.222	18 30 53.78
Sat.	30	18 37 32.87	11.069	23 10 15.2	9.93	2 42.53	1.212	18 34 50.33
SUN.	31	18 41 58.39	11.058	23 6 2.8	11.09	3 11.50	1.201	18 38 46.89
Mon.	32	18 46 23.63	11.045	S. 23 1 22.8	+12.24	3 40.18	1.188	18 42 43.45

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour,  
+9<sup>m</sup>.8565.  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	335	249 7 15.7	6 13.3	152.20	— 0.25	9.9937633	—27.8	h m s 7 18 17.84	
2	336	250 8 9.1	7 6.5	152.25	— 0.12	9.9936972	27.3	7 14 21.93	
3	337	251 9 3.6	8 0.8	152.29	+ 0.01	9.9936323	26.8	7 10 26.02	
4	338	252 9 59.1	8 56.2	152.33	+ 0.15	9.9935688	—26.2	7 6 30.11	
5	339	253 10 55.7	9 52.6	152.37	0.28	9.9935067	25.6	7 2 34.20	
6	340	254 11 52.9	10 49.6	152.40	0.39	9.9934461	24.9	6 58 38.28	
7	341	255 12 51.0	11 47.6	152.43	+ 0.48	9.9933872	—24.2	6 54 42.37	
8	342	256 13 49.8	12 46.2	152.46	0.55	9.9933299	23.5	6 50 46.46	
9	343	257 14 49.1	13 45.3	152.49	0.58	9.9932744	22.7	6 46 50.55	
10	344	258 15 49.1	14 45.2	152.51	+ 0.60	9.9932208	—21.8	6 42 54.64	
11	345	259 16 49.6	15 45.5	152.53	0.57	9.9931696	20.9	6 38 58.72	
12	346	260 17 50.6	16 46.3	152.56	0.51	9.9931204	19.9	6 35 2.81	
13	347	261 18 52.2	17 47.7	152.58	+ 0.44	9.9930737	—18.9	6 31 6.90	
14	348	262 19 54.3	18 49.6	152.60	0.34	9.9930296	17.8	6 27 10.99	
15	349	263 20 56.8	19 52.0	152.62	0.22	9.9929880	16.7	6 23 15.08	
16	350	264 21 59.9	20 54.9	152.64	+ 0.09	9.9929492	—15.6	6 19 19.17	
17	351	265 23 3.5	21 58.3	152.66	— 0.04	9.9929132	14.5	6 15 23.25	
18	352	266 24 7.7	23 2.3	152.69	0.16	9.9928798	13.3	6 11 27.34	
19	353	267 25 12.6	24 7.0	152.72	— 0.28	9.9928494	—12.1	6 7 31.43	
20	354	268 26 18.0	25 12.3	152.75	0.38	9.9928216	11.0	6 3 35.52	
21	355	269 27 24.1	26 18.2	152.77	0.45	9.9927966	9.9	5 59 39.60	
22	356	270 28 30.9	27 24.8	152.80	— 0.50	9.9927741	— 8.8	5 55 43.69	
23	357	271 29 38.4	28 32.1	152.82	0.53	9.9927542	7.8	5 51 47.78	
24	358	272 30 46.4	29 39.9	152.85	0.52	9.9927367	6.8	5 47 51.87	
25	359	273 31 55.1	30 48.5	152.88	— 0.47	9.9927213	— 5.9	5 43 55.96	
26	360	274 33 4.5	31 57.7	152.90	0.40	9.9927082	5.0	5 40 0.04	
27	361	275 34 14.3	33 7.3	152.92	0.31	9.9926973	4.1	5 36 4.13	
28	362	276 35 24.6	34 17.4	152.94	— 0.20	9.9926883	— 3.3	5 32 8.22	
29	363	277 36 35.2	35 27.8	152.95	— 0.07	9.9926810	2.6	5 28 12.31	
30	364	278 37 46.1	36 38.6	152.96	+ 0.06	9.9926754	1.9	5 24 16.40	
31	365	279 38 57.4	37 49.7	152.97	0.19	9.9926718	— 1.2	5 20 20.49	
32	366	280 40 8.8	39 0.9	152.97	+ 0.32	9.9926696	— 0.6	5 16 24.57	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .0.									Diff. for 1 Hour, —9 <sup>s</sup> .8296. (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	h m	h m	h m	"	h m	"	h m	m	d
1	15 36.8	15 42.4	57 11.3	+1.75	57 32.1	+1.70	23 18.2	2.36	28.1
2	15 47.8	15 52.9	57 52.0	1.61	58 10.7	1.50	0		29.1
3	15 57.6	16 1.8	58 27.9	1.36	58 43.3	1.20	0 16.1	2.45	0.5
4	16 5.4	16 8.5	58 56.6	+1.02	59 7.7	+0.83	1 15.2	2.46	1.5
5	16 10.8	16 12.6	59 16.5	0.63	59 22.9	0.44	2 13.7	2.41	2.5
6	16 13.7	16 14.3	59 27.1	+0.26	59 29.1	+0.09	3 10.3	2.31	3.5
7	16 14.3	16 13.8	59 29.2	-0.08	59 27.4	-0.22	4 4.4	2.20	4.5
8	16 12.9	16 11.6	59 24.0	0.34	59 19.2	0.45	4 56.1	2.11	5.5
9	16 9.9	16 8.0	59 13.1	0.55	59 6.0	0.63	5 46.2	2.07	6.5
10	16 5.8	16 3.4	58 57.9	-0.70	58 49.1	-0.77	6 35.7	2.06	7.5
11	16 0.8	15 57.9	58 39.5	0.83	58 29.1	0.89	7 25.5	2.10	8.5
12	15 54.9	15 51.8	58 18.1	0.94	58 6.5	1.00	8 16.6	2.16	9.5
13	15 48.4	15 44.9	57 54.2	-1.05	57 41.2	-1.11	9 9.2	2.23	10.5
14	15 41.2	15 37.4	57 27.7	1.15	57 13.5	1.20	10 3.3	2.28	11.5
15	15 33.4	15 29.2	56 58.8	1.24	56 43.7	1.28	10 58.2	2.29	12.5
16	15 25.0	15 20.8	56 28.2	-1.30	56 12.6	-1.30	11 52.6	2.24	13.5
17	15 16.5	15 12.2	55 57.0	1.29	55 41.6	1.27	12 45.3	2.15	14.5
18	15 8.3	15 4.3	55 26.6	1.22	55 12.2	1.16	13 35.5	2.03	15.5
19	15 0.7	14 57.3	54 58.8	-1.07	54 46.5	-0.97	14 22.8	1.91	16.5
20	14 54.4	14 51.8	54 35.6	0.85	54 26.2	0.70	15 7.4	1.81	17.5
21	14 49.8	14 48.3	54 18.7	0.54	54 13.2	-0.37	15 49.8	1.74	18.5
22	14 47.4	14 47.1	54 9.9	-0.18	54 8.9	+0.02	16 31.0	1.70	19.5
23	14 47.5	14 48.6	54 10.4	+0.23	54 14.5	0.45	17 11.7	1.70	20.5
24	14 50.4	14 52.9	54 21.1	0.67	54 30.4	0.88	17 52.9	1.75	21.5
25	14 56.2	15 0.1	54 42.3	+1.10	54 56.8	+1.31	18 35.8	1.83	22.5
26	15 4.7	15 9.9	55 13.7	1.50	55 32.8	1.68	19 21.2	1.96	23.5
27	15 15.7	15 22.0	55 54.0	1.84	56 17.0	1.97	20 10.0	2.11	24.5
28	15 28.6	15 35.5	56 41.4	+2.07	57 6.7	+2.14	21 2.7	2.28	25.5
29	15 42.6	15 49.6	57 32.6	2.16	57 58.5	2.14	21 59.1	2.42	26.5
30	15 56.5	16 3.1	58 23.9	2.07	58 48.2	1.95	22 58.3	2.50	27.5
31	16 9.3	16 14.8	59 10.7	1.78	59 31.0	1.58	23 58.5	2.51	28.5
32	16 19.6	16 23.5	59 48.5	+1.33	60 2.8	+1.05	0		29.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 1.					SUNDAY 3.				
0	15 7 8.30	2.3143	S. 20 18 49.8	6.493	0	17 3 48.77	2.5171	S. 23 6 56.3	0.165
1	15 9 27.33	2.3200	20 25 16.2	6.385	1	17 6 19.85	2.5190	23 7 1.7	- 0.014
2	15 11 46.70	2.3257	20 31 36.0	6.275	2	17 8 51.05	2.5209	23 6 58.0	+ 0.156
3	15 14 6.41	2.3313	20 37 49.2	6.165	3	17 11 22.36	2.5226	23 6 45.4	0.286
4	15 16 26.45	2.3368	20 43 55.8	6.054	4	17 13 53.76	2.5242	23 6 23.7	0.437
5	15 18 46.83	2.3425	20 49 55.7	5.942	5	17 16 25.26	2.5258	23 5 53.0	0.588
6	15 21 7.55	2.3480	20 55 48.8	5.828	6	17 18 56.85	2.5271	23 5 13.2	0.739
7	15 23 28.59	2.3534	21 1 35.0	5.713	7	17 21 28.51	2.5283	23 4 24.3	0.891
8	15 25 49.96	2.3589	21 7 14.3	5.598	8	17 24 0.24	2.5294	23 3 26.3	1.043
9	15 28 11.66	2.3643	21 12 46.7	5.480	9	17 26 32.04	2.5305	23 2 19.2	1.194
10	15 30 33.68	2.3697	21 18 11.9	5.361	10	17 29 3.90	2.5313	23 1 3.0	1.347
11	15 32 56.02	2.3750	21 23 30.0	5.242	11	17 31 35.80	2.5321	22 59 37.6	1.498
12	15 35 18.68	2.3802	21 28 40.9	5.121	12	17 34 7.75	2.5328	22 58 3.2	1.649
13	15 37 41.65	2.3854	21 33 44.5	4.999	13	17 36 39.74	2.5333	22 56 19.7	1.802
14	15 40 4.93	2.3906	21 38 40.8	4.877	14	17 39 11.75	2.5338	22 54 27.0	1.954
15	15 42 28.52	2.3957	21 43 29.7	4.753	15	17 41 43.79	2.5342	22 52 25.2	2.106
16	15 44 52.41	2.4007	21 48 11.1	4.628	16	17 44 15.85	2.5345	22 50 14.3	2.258
17	15 47 16.60	2.4056	21 52 45.0	4.502	17	17 46 47.91	2.5348	22 47 54.3	2.409
18	15 49 41.08	2.4104	21 57 11.3	4.374	18	17 49 19.97	2.5349	22 45 25.2	2.561
19	15 52 5.85	2.4153	22 1 29.9	4.246	19	17 51 52.03	2.5349	22 42 47.0	2.713
20	15 54 30.91	2.4201	22 5 40.8	4.117	20	17 54 24.07	2.5339	22 39 59.7	2.865
21	15 56 56.26	2.4248	22 9 43.9	3.987	21	17 56 56.10	2.5336	22 37 3.4	3.014
22	15 59 21.88	2.4293	22 13 39.2	3.856	22	17 59 28.10	2.5331	22 33 58.0	3.165
23	16 1 47.78	2.4338	S. 22 17 26.6	3.723	23	18 2 0.07	2.5324	S. 22 30 43.6	3.315
SATURDAY 2.					MONDAY 4.				
0	16 4 13.94	2.4383	S. 22 21 6.0	3.590	0	18 4 31.99	2.5317	S. 22 27 20.2	3.465
1	16 6 40.37	2.4427	22 24 37.4	3.457	1	18 7 3.87	2.5308	22 23 47.8	3.615
2	16 9 7.06	2.4470	22 28 0.8	3.322	2	18 9 35.69	2.5298	22 20 6.4	3.765
3	16 11 34.01	2.4512	22 31 16.0	3.185	3	18 12 7.45	2.5288	22 16 16.0	3.914
4	16 14 1.20	2.4553	22 34 23.0	3.048	4	18 14 39.15	2.5277	22 12 16.7	4.063
5	16 16 28.64	2.4593	22 37 21.8	2.912	5	18 17 10.78	2.5265	22 8 8.5	4.211
6	16 18 56.32	2.4633	22 40 12.4	2.773	6	18 19 42.33	2.5251	22 3 51.4	4.358
7	16 21 24.23	2.4671	22 42 54.6	2.633	7	18 22 13.79	2.5236	21 59 25.5	4.505
8	16 23 52.37	2.4709	22 45 28.4	2.493	8	18 24 45.16	2.5220	21 54 50.8	4.652
9	16 26 20.74	2.4746	22 47 53.8	2.353	9	18 27 16.43	2.5203	21 50 7.3	4.798
10	16 28 49.32	2.4781	22 50 10.8	2.212	10	18 29 47.60	2.5187	21 45 15.1	4.943
11	16 31 18.11	2.4815	22 52 19.2	2.069	11	18 32 18.67	2.5168	21 40 14.1	5.089
12	16 33 47.10	2.4848	22 54 19.1	1.927	12	18 34 49.62	2.5148	21 35 4.4	5.233
13	16 36 16.29	2.4882	22 56 10.3	1.783	13	18 37 20.45	2.5128	21 29 46.1	5.376
14	16 38 45.68	2.4914	22 57 53.0	1.638	14	18 39 51.15	2.5106	21 24 19.3	5.518
15	16 41 15.26	2.4944	22 59 26.9	1.493	15	18 42 21.72	2.5083	21 18 43.9	5.661
16	16 43 45.01	2.4973	23 0 52.1	1.348	16	18 44 52.15	2.5060	21 13 0.0	5.802
17	16 46 14.94	2.5002	23 2 8.6	1.202	17	18 47 22.44	2.5037	21 7 7.7	5.942
18	16 48 45.03	2.5029	23 3 16.3	1.055	18	18 49 52.59	2.5012	21 1 7.0	6.082
19	16 51 15.29	2.5056	23 4 15.2	0.908	19	18 52 22.58	2.4986	20 54 57.9	6.221
20	16 53 45.70	2.5081	23 5 5.2	0.760	20	18 54 52.42	2.4959	20 48 40.5	6.359
21	16 56 16.26	2.5105	23 5 46.4	0.612	21	18 57 22.09	2.4932	20 42 14.8	6.496
22	16 58 46.96	2.5128	23 6 18.6	0.463	22	18 59 51.60	2.4904	20 35 41.0	6.632
23	17 1 17.80	2.5151	23 6 41.9	0.314	23	19 2 20.94	2.4875	20 28 59.0	6.768
24	17 3 48.77	2.5171	S. 23 6 56.3	0.165	24	19 4 50.10	2.4845	S. 20 22 8.9	6.902

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 5.					THURSDAY 7.				
0	19 4 50.10	2.4845	S. 20 22 8.9	6.902	0	20 59 51.01	2.3013	S. 12 37 57.1	11.943
1	19 7 19.08	2.4815	20 15 10.8	7.035	1	21 2 8.97	2.2974	12 25 58.3	12.016
2	19 9 47.88	2.4784	20 8 4.7	7.168	2	21 4 26.70	2.2936	12 13 55.2	12.086
3	19 12 16.49	2.4753	20 0 50.7	7.298	3	21 6 44.20	2.2898	12 1 48.0	12.155
4	19 14 44.91	2.4720	19 53 28.9	7.426	4	21 9 1.48	2.2861	11 49 36.6	12.223
5	19 17 13.13	2.4688	19 45 59.3	7.558	5	21 11 18.53	2.2824	11 37 21.2	12.289
6	19 19 41.16	2.4654	19 38 21.9	7.687	6	21 13 35.37	2.2788	11 25 1.9	12.354
7	19 22 8.98	2.4619	19 30 36.9	7.814	7	21 15 51.99	2.2752	11 12 38.7	12.418
8	19 24 36.59	2.4585	19 22 44.2	7.941	8	21 18 8.39	2.2715	11 0 11.8	12.479
9	19 27 4.00	2.4551	19 14 44.0	8.065	9	21 20 24.57	2.2679	10 47 41.2	12.540
10	19 29 31.20	2.4515	19 6 36.4	8.188	10	21 22 40.54	2.2645	10 35 7.0	12.600
11	19 31 58.18	2.4478	18 58 21.4	8.311	11	21 24 56.31	2.2610	10 22 29.2	12.658
12	19 34 24.94	2.4442	18 49 59.1	8.433	12	21 27 11.86	2.2575	10 9 48.1	12.713
13	19 36 51.48	2.4405	18 41 29.5	8.553	13	21 29 27.21	2.2542	9 57 3.6	12.768
14	19 39 17.80	2.4368	18 32 52.7	8.673	14	21 31 42.37	2.2509	9 44 15.9	12.822
15	19 41 43.89	2.4339	18 24 8.8	8.791	15	21 33 57.32	2.2476	9 31 25.0	12.873
16	19 44 9.75	2.4302	18 15 17.8	8.908	16	21 36 12.08	2.2443	9 18 31.1	12.924
17	19 46 35.39	2.4254	18 6 19.9	9.023	17	21 38 26.64	2.2411	9 5 34.1	12.974
18	19 49 0.80	2.4215	17 57 15.1	9.137	18	21 40 41.01	2.2380	8 52 34.2	13.028
19	19 51 25.97	2.4176	17 48 3.5	9.250	19	21 42 55.20	2.2350	8 39 31.5	13.068
20	19 53 50.91	2.4137	17 38 45.1	9.362	20	21 45 9.21	2.2319	8 26 26.0	13.114
21	19 56 15.61	2.4097	17 29 20.1	9.472	21	21 47 23.03	2.2288	8 13 17.8	13.158
22	19 58 40.07	2.4057	17 19 48.5	9.582	22	21 49 36.67	2.2259	8 0 7.1	13.199
23	20 1 4.29	2.4018	S. 17 10 10.3	9.690	23	21 51 50.14	2.2230	S. 7 46 53.9	13.241
WEDNESDAY 6.					FRIDAY 8.				
0	20 3 28.28	2.3978	S. 17 0 25.7	9.796	0	21 54 3.43	2.2202	S. 7 33 38.2	13.281
1	20 5 52.02	2.3937	16 50 34.8	9.901	1	21 56 16.56	2.2174	7 20 20.2	13.318
2	20 8 15.52	2.3897	16 40 37.6	10.005	2	21 58 29.52	2.2147	7 7 0.0	13.355
3	20 10 38.78	2.3856	16 30 34.2	10.108	3	22 0 42.32	2.2120	6 53 37.6	13.391
4	20 13 1.79	2.3815	16 20 24.7	10.209	4	22 2 54.96	2.2094	6 40 13.1	13.425
5	20 15 24.56	2.3775	16 10 9.1	10.309	5	22 5 7.45	2.2069	6 26 46.6	13.458
6	20 17 47.09	2.3734	15 59 47.6	10.408	6	22 7 19.79	2.2044	6 13 18.2	13.489
7	20 20 9.37	2.3693	15 49 20.2	10.504	7	22 9 31.98	2.2019	5 59 47.9	13.519
8	20 22 31.41	2.3653	15 38 47.1	10.600	8	22 11 44.02	2.1995	5 46 15.9	13.548
9	20 24 53.20	2.3612	15 28 8.2	10.695	9	22 13 55.92	2.1972	5 32 42.1	13.576
10	20 27 14.75	2.3571	15 17 23.7	10.788	10	22 16 7.68	2.1949	5 19 6.8	13.601
11	20 29 36.05	2.3530	15 6 33.6	10.880	11	22 18 19.31	2.1928	5 5 30.0	13.625
12	20 31 57.11	2.3489	14 55 38.1	10.970	12	22 20 30.81	2.1907	4 51 51.8	13.648
13	20 34 17.92	2.3448	14 44 37.2	11.058	13	22 22 42.19	2.1886	4 38 12.2	13.671
14	20 36 38.49	2.3408	14 33 31.1	11.145	14	22 24 53.44	2.1865	4 24 31.3	13.692
15	20 38 58.82	2.3368	14 22 19.8	11.232	15	22 27 4.57	2.1846	4 10 49.2	13.711
16	20 41 18.91	2.3328	14 11 3.3	11.317	16	22 29 15.59	2.1828	3 57 6.0	13.728
17	20 43 38.75	2.3288	13 59 41.8	11.400	17	22 31 26.50	2.1809	3 43 21.8	13.745
18	20 45 58.36	2.3248	13 48 15.3	11.483	18	22 33 37.30	2.1791	3 29 36.6	13.761
19	20 48 17.73	2.3208	13 36 43.9	11.563	19	22 35 47.99	2.1773	3 15 50.5	13.775
20	20 50 36.86	2.3168	13 25 7.8	11.641	20	22 37 58.58	2.1757	3 2 3.6	13.788
21	20 52 55.75	2.3128	13 13 27.0	11.719	21	22 40 9.08	2.1742	2 48 16.0	13.799
22	20 55 14.40	2.3089	13 1 41.5	11.796	22	22 42 19.49	2.1727	2 34 27.7	13.810
23	20 57 32.82	2.3051	12 49 51.5	11.870	23	22 44 29.80	2.1712	2 20 38.8	13.818
24	20 59 51.01	2.3013	S. 12 37 57.1	11.943	24	22 46 40.03	2.1698	S. 2 6 49.5	13.825



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 9.					MONDAY 11.				
0	22 46 40.03	2.1698	S. 2 6 49.5	13.825	0	0 30 27.15	2.1781	N. 8 41 39.8	12.726
1	22 48 50.18	2.1685	I 52 59.8	13.832	1	0 32 37.88	2.1797	8 54 21.8	12.673
2	22 51 0.25	2.1673	I 39 9.7	13.838	2	0 34 48.71	2.1812	9 7 0.6	12.620
3	22 53 10.25	2.1661	I 25 19.3	13.841	3	0 36 59.63	2.1828	9 19 36.2	12.566
4	22 55 20.18	2.1650	I 11 28.8	13.843	4	0 39 10.65	2.1846	9 32 8.5	12.510
5	22 57 30.05	2.1639	0 57 38.2	13.844	5	0 41 21.78	2.1864	9 44 37.4	12.453
6	22 59 39.85	2.1629	0 43 47.5	13.844	6	0 43 33.02	2.1883	9 57 2.8	12.394
7	23 1 49.60	2.1620	0 29 56.9	13.843	7	0 45 44.37	2.1901	10 9 24.7	12.335
8	23 3 59.29	2.1612	0 16 6.4	13.840	8	0 47 55.83	2.1920	10 21 43.0	12.275
9	23 6 8.94	2.1604	S. 0 2 16.1	13.836	9	0 50 7.41	2.1939	10 33 57.7	12.214
10	23 8 18.54	2.1597	N. 0 11 33.9	13.831	10	0 52 19.10	2.1958	10 46 8.7	12.152
11	23 10 28.10	2.1590	0 25 23.6	13.824	11	0 54 30.91	2.1978	10 58 15.9	12.088
12	23 12 37.62	2.1584	0 39 12.8	13.816	12	0 56 42.84	2.1999	11 10 19.2	12.023
13	23 14 47.11	2.1579	0 53 1.5	13.808	13	0 58 54.90	2.2020	11 22 18.6	11.956
14	23 16 56.57	2.1574	I 6 49.7	13.798	14	I 1 7.08	2.2041	11 34 13.9	11.888
15	23 19 6.00	2.1570	I 20 37.2	13.786	15	I 3 19.39	2.2063	11 46 5.2	11.821
16	23 21 15.41	2.1567	I 34 24.0	13.773	16	I 5 31.84	2.2086	11 57 52.4	11.751
17	23 23 24.80	2.1563	I 48 10.0	13.759	17	I 7 44.42	2.2108	12 9 35.3	11.680
18	23 25 34.17	2.1562	2 1 55.1	13.744	18	I 9 57.13	2.2129	12 21 14.0	11.609
19	23 27 43.54	2.1561	2 15 39.3	13.728	19	I 12 9.97	2.2153	12 32 48.4	11.536
20	23 29 52.90	2.1559	2 29 22.4	13.709	20	I 14 22.96	2.2176	12 44 18.3	11.462
21	23 32 2.25	2.1559	2 43 4.4	13.691	21	I 16 36.08	2.2199	12 55 43.8	11.387
22	23 34 11.61	2.1561	2 56 45.3	13.672	22	I 18 49.35	2.2223	13 7 4.7	11.311
23	23 36 20.98	2.1562	N. 3 10 25.0	13.650	23	I 21 2.76	2.2247	N. 13 18 21.1	11.234
SUNDAY 10.					TUESDAY 12.				
0	23 38 30.35	2.1563	N. 3 24 3.3	13.627	0	I 23 16.31	2.2271	N. 13 29 32.8	11.156
1	23 40 39.73	2.1565	3 37 40.2	13.603	1	I 25 30.01	2.2296	13 40 39.8	11.077
2	23 42 49.13	2.1568	3 51 15.7	13.578	2	I 27 43.86	2.2320	13 51 42.0	10.996
3	23 44 58.55	2.1572	4 4 49.6	13.552	3	I 29 57.85	2.2345	14 2 39.3	10.914
4	23 47 7.99	2.1576	4 18 21.9	13.525	4	I 32 12.00	2.2370	14 13 31.7	10.832
5	23 49 17.46	2.1581	4 31 52.6	13.497	5	I 34 26.29	2.2395	14 24 19.1	10.748
6	23 51 26.96	2.1586	4 45 21.5	13.466	6	I 36 40.74	2.2421	14 35 1.4	10.663
7	23 53 36.49	2.1592	4 58 48.5	13.435	7	I 38 55.34	2.2447	14 45 38.6	10.578
8	23 55 46.06	2.1598	5 12 13.7	13.403	8	I 41 10.10	2.2473	14 56 10.7	10.491
9	23 57 55.67	2.1606	5 25 36.9	13.369	9	I 43 25.01	2.2498	15 6 37.5	10.403
10	0 0 5.33	2.1613	5 38 58.0	13.334	10	I 45 40.07	2.2523	15 16 59.0	10.314
11	0 2 15.03	2.1622	5 52 17.0	13.299	11	I 47 55.29	2.2550	15 27 15.2	10.224
12	0 4 24.79	2.1632	6 5 33.9	13.263	12	I 50 10.67	2.2576	15 37 25.9	10.133
13	0 6 34.61	2.1641	6 18 48.5	13.224	13	I 52 26.20	2.2602	15 47 31.1	10.041
14	0 8 44.48	2.1650	6 32 0.8	13.184	14	I 54 41.89	2.2628	15 57 30.8	9.948
15	0 10 54.41	2.1661	6 45 10.6	13.143	15	I 56 57.74	2.2654	16 7 24.8	9.853
16	0 13 4.41	2.1673	6 58 18.0	13.102	16	I 59 13.74	2.2680	16 17 13.2	9.758
17	0 15 14.48	2.1684	7 11 22.9	13.059	17	2 1 29.90	2.2707	16 26 55.8	9.663
18	0 17 24.62	2.1697	7 24 25.1	13.015	18	2 3 46.22	2.2733	16 36 32.7	9.566
19	0 19 34.84	2.1709	7 37 24.7	12.970	19	2 6 2.70	2.2759	16 46 3.7	9.468
20	0 21 45.13	2.1723	7 50 21.5	12.923	20	2 8 19.33	2.2785	16 55 28.8	9.368
21	0 23 55.51	2.1737	8 3 15.5	12.876	21	2 10 36.12	2.2811	17 4 47.9	9.268
22	0 26 5.97	2.1750	8 16 6.6	12.828	22	2 12 53.06	2.2837	17 14 1.0	9.168
23	0 28 16.51	2.1765	8 28 54.7	12.777	23	2 15 10.16	2.2863	17 23 8.0	9.065
24	0 30 27.15	2.1781	N. 8 41 39.8	12.726	24	2 17 27.42	2.2889	N. 17 32 8.8	8.963

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 13.					FRIDAY 15.				
0	2 17 27.42	2.2889	N.17 32 8.8	8.965	0	4 9 41.77	2.3685	N.22 29 7.4	3.178
1	2 19 44.83	2.2914	17 41 3.5	8.859	1	4 12 3.89	2.3687	22 32 14.1	3.046
2	2 22 2.39	2.2940	17 49 51.9	8.754	2	4 14 26.02	2.3688	22 35 12.9	2.914
3	2 24 20.11	2.2966	17 58 34.0	8.649	3	4 16 48.15	2.3688	22 38 3.8	2.782
4	2 26 37.98	2.2991	18 7 9.8	8.543	4	4 19 10.28	2.3688	22 40 46.7	2.649
5	2 28 56.00	2.3016	18 15 39.2	8.436	5	4 21 32.40	2.3686	22 43 21.7	2.517
6	2 31 14.17	2.3040	18 24 2.1	8.328	6	4 23 54.51	2.3684	22 45 48.7	2.384
7	2 33 32.48	2.3064	18 32 18.5	8.219	7	4 26 16.61	2.3681	22 48 7.8	2.252
8	2 35 50.94	2.3089	18 40 28.4	8.109	8	4 28 38.68	2.3677	22 50 18.9	2.118
9	2 38 9.55	2.3113	18 48 31.6	7.998	9	4 31 0.73	2.3673	22 52 22.0	1.986
10	2 40 28.30	2.3137	18 56 28.2	7.887	10	4 33 22.75	2.3667	22 54 17.2	1.853
11	2 42 47.19	2.3160	19 4 18.0	7.775	11	4 35 44.73	2.3660	22 56 4.4	1.720
12	2 45 6.22	2.3183	19 12 1.0	7.660	12	4 38 6.67	2.3653	22 57 43.6	1.588
13	2 47 25.39	2.3207	19 19 37.2	7.547	13	4 40 28.57	2.3645	22 59 14.9	1.455
14	2 49 44.70	2.3229	19 27 6.6	7.433	14	4 42 50.41	2.3636	23 0 38.2	1.323
15	2 52 4.14	2.3251	19 34 29.1	7.317	15	4 45 12.20	2.3627	23 1 53.6	1.191
16	2 54 23.71	2.3273	19 41 44.6	7.201	16	4 47 33.93	2.3616	23 3 1.1	1.058
17	2 56 43.41	2.3294	19 48 53.2	7.084	17	4 49 55.59	2.3604	23 4 0.6	0.926
18	2 59 3.24	2.3315	19 55 54.7	6.966	18	4 52 17.18	2.3592	23 4 52.2	0.793
19	3 1 23.19	2.3335	20 2 49.1	6.848	19	4 54 38.69	2.3579	23 5 35.8	0.662
20	3 3 43.26	2.3356	20 9 36.4	6.729	20	4 57 0.13	2.3566	23 6 11.6	0.531
21	3 6 3.46	2.3376	20 16 16.6	6.610	21	4 59 21.48	2.3551	23 6 39.5	0.399
22	3 8 23.77	2.3394	20 22 49.6	6.489	22	5 1 42.74	2.3536	23 6 59.5	0.268
23	3 10 44.19	2.3413	N.20 29 15.3	6.368	23	5 4 3.91	2.3519	N.23 7 11.6	0.136
THURSDAY 14.					SATURDAY 16.				
0	3 13 4.73	2.3432	N.20 35 33.7	6.246	0	5 6 24.97	2.3502	N.23 7 15.8	+ 0.005
1	3 15 25.37	2.3449	20 41 44.8	6.123	1	5 8 45.93	2.3484	23 7 12.2	- 0.125
2	3 17 46.12	2.3467	20 47 48.5	6.001	2	5 11 6.78	2.3466	23 7 0.8	0.254
3	3 20 6.97	2.3483	20 53 44.9	5.878	3	5 13 27.52	2.3446	23 6 41.7	0.384
4	3 22 27.92	2.3499	20 59 33.8	5.753	4	5 15 48.13	2.3425	23 6 14.7	0.514
5	3 24 48.96	2.3515	21 5 15.2	5.628	5	5 18 8.62	2.3405	23 5 40.0	0.643
6	3 27 10.10	2.3530	21 10 49.2	5.503	6	5 20 28.99	2.3383	23 4 57.6	0.771
7	3 29 31.32	2.3543	21 16 15.6	5.378	7	5 22 49.22	2.3360	23 4 7.5	0.899
8	3 31 52.62	2.3558	21 21 34.5	5.252	8	5 25 9.31	2.3337	23 3 9.7	1.028
9	3 34 14.01	2.3572	21 26 45.8	5.125	9	5 27 29.26	2.3313	23 2 4.2	1.155
10	3 36 35.48	2.3583	21 31 49.5	4.998	10	5 29 49.06	2.3288	23 0 51.1	1.282
11	3 38 57.01	2.3595	21 36 45.5	4.869	11	5 32 8.71	2.3265	22 59 30.4	1.408
12	3 41 18.62	2.3607	21 41 33.8	4.742	12	5 34 28.21	2.3236	22 58 2.2	1.533
13	3 43 40.29	2.3618	21 46 14.5	4.613	13	5 36 47.54	2.3208	22 56 26.4	1.659
14	3 46 2.03	2.3628	21 50 47.4	4.484	14	5 39 6.71	2.3181	22 54 43.1	1.784
15	3 48 23.82	2.3636	21 55 12.6	4.355	15	5 41 25.71	2.3153	22 52 52.3	1.909
16	3 50 45.66	2.3644	21 59 30.0	4.225	16	5 43 44.54	2.3123	22 50 54.0	2.033
17	3 53 7.55	2.3652	22 3 39.6	4.095	17	5 46 3.19	2.3093	22 48 48.3	2.156
18	3 55 29.48	2.3659	22 7 41.4	3.965	18	5 48 21.66	2.3063	22 46 35.3	2.278
19	3 57 51.46	2.3666	22 11 35.4	3.835	19	5 50 39.94	2.3032	22 44 14.9	2.401
20	4 0 13.47	2.3671	22 15 21.6	3.704	20	5 52 58.04	2.3000	22 41 47.2	2.522
21	4 2 35.51	2.3676	22 18 59.9	3.573	21	5 55 15.94	2.2968	22 39 12.3	2.643
22	4 4 57.58	2.3680	22 22 30.3	3.441	22	5 57 33.65	2.2935	22 36 30.1	2.763
23	4 7 19.67	2.3683	22 25 52.8	3.309	23	5 59 51.16	2.2901	22 33 40.7	2.883
24	4 9 41.77	2.3685	N.22 29 7.4	3.178	24	6 2 8.46	2.2867	N.22 30 44.1	3.003

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 17.					TUESDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 2 8.46	2.2867	N.22 30 44.1	3.003	1	7 47 9.83	2.0803	N.18 4 26.4	7.763
1	6 4 25.56	2.2832	22 27 40.4	3.121	1	7 49 14.51	2.0758	17 56 38.3	7.840
2	6 6 42.44	2.2796	22 24 29.6	3.238	2	7 51 18.92	2.0713	17 48 45.6	7.917
3	6 8 59.11	2.2760	22 21 11.8	3.355	3	7 53 23.06	2.0668	17 40 48.3	7.993
4	6 11 15.56	2.2724	22 17 47.0	3.471	4	7 55 26.93	2.0622	17 32 46.5	8.067
5	6 13 31.80	2.2688	22 14 15.3	3.586	5	7 57 30.52	2.0577	17 24 40.3	8.140
6	6 15 47.81	2.2649	22 10 36.7	3.701	6	7 59 33.85	2.0532	17 16 29.7	8.213
7	6 18 3.59	2.2611	22 6 51.2	3.816	7	8 1 36.90	2.0486	17 8 14.7	8.286
8	6 20 19.14	2.2573	22 2 58.8	3.929	8	8 3 39.68	2.0442	16 59 55.4	8.357
9	6 22 34.46	2.2533	21 58 59.7	4.041	9	8 5 42.20	2.0398	16 51 31.9	8.427
10	6 24 49.54	2.2493	21 54 53.9	4.153	10	8 7 44.45	2.0353	16 43 4.2	8.495
11	6 27 4.38	2.2454	21 50 41.4	4.264	11	8 9 46.44	2.0309	16 34 32.5	8.565
12	6 29 18.99	2.2414	21 46 22.2	4.374	12	8 11 48.16	2.0265	16 25 56.6	8.632
13	6 31 33.35	2.2373	21 41 56.5	4.483	13	8 13 49.62	2.0222	16 17 16.7	8.698
14	6 33 47.46	2.2332	21 37 24.2	4.593	14	8 15 50.82	2.0178	16 8 32.9	8.763
15	6 36 1.33	2.2291	21 32 45.4	4.700	15	8 17 51.76	2.0135	15 59 45.1	8.828
16	6 38 14.95	2.2249	21 28 0.2	4.807	16	8 19 52.44	2.0092	15 50 53.5	8.893
17	6 40 28.32	2.2207	21 23 8.6	4.913	17	8 21 52.86	2.0049	15 41 58.0	8.956
18	6 42 41.43	2.2163	21 18 10.7	5.018	18	8 23 53.03	2.0008	15 32 58.8	9.018
19	6 44 54.28	2.2121	21 13 6.5	5.123	19	8 25 52.95	1.9966	15 23 55.9	9.079
20	6 47 6.88	2.2078	21 7 56.0	5.226	20	8 27 52.62	1.9924	15 14 49.3	9.140
21	6 49 19.21	2.2034	21 2 39.4	5.328	21	8 29 52.04	1.9883	15 5 39.1	9.199
22	6 51 31.29	2.1991	20 57 16.6	5.431	22	8 31 51.21	1.9842	14 56 25.4	9.258
23	6 53 43.10	2.1946	N.20 51 47.7	5.531	23	8 33 50.14	1.9801	N.14 47 8.1	9.317
MONDAY 18.					WEDNESDAY 20.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 55 54.64	2.1902	N.20 46 12.9	5.631	1	8 35 48.82	1.9760	N.14 37 47.4	9.373
1	6 58 5.92	2.1858	20 40 32.0	5.731	1	8 37 47.26	1.9721	14 28 23.3	9.430
2	7 0 16.93	2.1813	20 34 45.2	5.828	2	8 39 45.47	1.9682	14 18 55.8	9.485
3	7 2 27.67	2.1768	20 28 52.6	5.926	3	8 41 43.44	1.9643	14 9 25.1	9.539
4	7 4 38.14	2.1723	20 22 54.1	6.023	4	8 43 41.18	1.9603	13 59 51.1	9.593
5	7 6 48.34	2.1678	20 16 49.9	6.118	5	8 45 38.68	1.9564	13 50 13.9	9.647
6	7 8 58.27	2.1632	20 10 39.9	6.213	6	8 47 35.95	1.9527	13 40 33.5	9.699
7	7 11 7.92	2.1586	20 4 24.3	6.307	7	8 49 33.00	1.9490	13 30 50.0	9.750
8	7 13 17.30	2.1541	19 58 3.1	6.400	8	8 51 29.83	1.9453	13 21 3.5	9.801
9	7 15 26.41	2.1495	19 51 36.3	6.493	9	8 53 26.43	1.9415	13 11 13.9	9.851
10	7 17 35.24	2.1448	19 45 4.0	6.583	10	8 55 22.81	1.9378	13 1 21.4	9.900
11	7 19 43.79	2.1403	19 38 26.3	6.673	11	8 57 18.97	1.9343	12 51 26.0	9.948
12	7 21 52.07	2.1357	19 31 43.3	6.762	12	8 59 14.92	1.9308	12 41 27.7	9.995
13	7 24 0.07	2.1311	19 24 54.9	6.851	13	9 1 10.66	1.9272	12 31 26.6	10.042
14	7 26 7.80	2.1265	19 18 1.2	6.938	14	9 3 6.18	1.9237	12 21 22.7	10.088
15	7 28 15.25	2.1218	19 11 2.3	7.024	15	9 5 1.50	1.9203	12 11 16.0	10.133
16	7 30 22.42	2.1172	19 3 58.3	7.110	16	9 6 56.61	1.9168	12 1 6.7	10.177
17	7 32 29.31	2.1126	18 56 49.1	7.195	17	9 8 51.52	1.9133	11 50 54.8	10.220
18	7 34 35.93	2.1080	18 49 34.9	7.279	18	9 10 46.24	1.9103	11 40 40.3	10.263
19	7 36 42.27	2.1034	18 42 15.6	7.363	19	9 12 40.76	1.9070	11 30 23.2	10.306
20	7 38 48.34	2.0988	18 34 51.4	7.443	20	9 14 35.08	1.9038	11 20 3.6	10.347
21	7 40 54.13	2.0942	18 27 22.4	7.524	21	9 16 29.22	1.9008	11 9 41.6	10.388
22	7 42 59.64	2.0895	18 19 48.5	7.605	22	9 18 23.17	1.8976	10 59 17.1	10.428
23	7 45 4.87	2.0849	18 12 9.8	7.684	23	9 20 16.93	1.8945	10 48 50.3	10.466
24	7 47 9.83	2.0803	N.18 4 26.4	7.763	24	9 22 10.51	1.8915	N.10 38 21.2	10.504

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 21.					SATURDAY 23.				
0	9 22 10.51	1.8915	N. 10 38 21.2	10.504	0	10 50 32.53	1.8127	N. 1 42 50.9	11.564
1	9 24 3.91	1.8886	10 27 49.8	10.542	1	10 52 21.28	1.8125	1 31 16.8	11.572
2	9 25 57.14	1.8858	10 17 16.2	10.578	2	10 54 10.03	1.8124	1 19 42.3	11.578
3	9 27 50.20	1.8828	10 6 40.4	10.615	3	10 55 58.77	1.8123	1 8 7.4	11.584
4	9 29 43.08	1.8800	9 56 2.4	10.651	4	10 57 47.51	1.8123	0 56 32.2	11.590
5	9 31 35.80	1.8773	9 45 22.3	10.685	5	10 59 36.25	1.8124	0 44 56.6	11.595
6	9 33 28.36	1.8747	9 34 40.2	10.719	6	11 1 25.00	1.8126	0 33 20.8	11.598
7	9 35 20.76	1.8720	9 23 56.0	10.753	7	11 3 13.76	1.8128	0 21 44.8	11.602
8	9 37 13.00	1.8693	9 13 9.9	10.784	8	11 5 2.53	1.8130	N. 0 10 8.6	11.605
9	9 39 5.08	1.8668	9 2 21.9	10.817	9	11 6 51.32	1.8133	S. 0 1 27.8	11.608
10	9 40 57.01	1.8643	8 51 31.9	10.848	10	11 8 40.13	1.8138	0 13 4.4	11.610
11	9 42 48.80	1.8619	8 40 40.1	10.879	11	11 10 28.97	1.8143	0 24 41.0	11.611
12	9 44 40.44	1.8595	8 29 46.4	10.909	12	11 12 17.84	1.8148	0 36 17.7	11.612
13	9 46 31.94	1.8572	8 18 51.0	10.938	13	11 14 6.74	1.8153	0 47 54.4	11.612
14	9 48 23.30	1.8548	8 7 53.8	10.968	14	11 15 55.68	1.8160	0 59 31.1	11.612
15	9 50 14.53	1.8528	7 56 54.9	10.995	15	11 17 44.66	1.8167	1 11 7.8	11.611
16	9 52 5.63	1.8506	7 45 54.4	11.022	16	11 19 33.68	1.8174	1 22 44.4	11.609
17	9 53 56.60	1.8485	7 34 52.3	11.048	17	11 21 22.75	1.8183	1 34 20.9	11.607
18	9 55 47.45	1.8465	7 23 48.6	11.075	18	11 23 11.88	1.8193	1 45 57.2	11.603
19	9 57 38.18	1.8445	7 12 43.3	11.101	19	11 25 1.06	1.8202	1 57 33.3	11.600
20	9 59 28.79	1.8425	7 1 36.5	11.125	20	11 26 50.30	1.8212	2 9 9.2	11.597
21	10 1 19.28	1.8406	6 50 28.3	11.148	21	11 28 39.60	1.8223	2 20 44.9	11.593
22	10 3 9.66	1.8388	6 39 18.7	11.172	22	11 30 28.97	1.8234	2 32 20.3	11.587
23	10 4 59.94	1.8372	N. 6 28 7.7	11.195	23	11 32 18.41	1.8247	S. 2 43 55.3	11.580
FRIDAY 22.					SUNDAY 24.				
0	10 6 50.12	1.8354	N. 6 16 55.3	11.218	0	11 34 7.93	1.8260	S. 2 55 29.9	11.574
1	10 8 40.19	1.8338	6 5 41.6	11.238	1	11 35 57.53	1.8274	3 7 4.2	11.568
2	10 10 30.17	1.8323	5 54 26.7	11.259	2	11 37 47.22	1.8288	3 18 38.0	11.560
3	10 12 20.06	1.8307	5 43 10.5	11.279	3	11 39 36.99	1.8303	3 30 11.4	11.552
4	10 14 9.85	1.8292	5 31 53.2	11.298	4	11 41 26.85	1.8318	3 41 44.2	11.543
5	10 15 59.56	1.8278	5 20 34.7	11.318	5	11 43 16.81	1.8335	3 53 16.5	11.533
6	10 17 49.19	1.8265	5 9 15.1	11.336	6	11 45 6.87	1.8352	4 4 48.2	11.523
7	10 19 38.74	1.8253	4 57 54.4	11.354	7	11 46 57.03	1.8369	4 16 19.3	11.513
8	10 21 28.22	1.8240	4 46 32.6	11.372	8	11 48 47.30	1.8388	4 27 49.8	11.502
9	10 23 17.62	1.8228	4 35 9.8	11.388	9	11 50 37.68	1.8406	4 39 19.5	11.489
10	10 25 6.95	1.8217	4 23 46.0	11.404	10	11 52 28.17	1.8425	4 50 48.5	11.477
11	10 26 56.22	1.8207	4 12 21.3	11.419	11	11 54 18.78	1.8446	5 2 16.7	11.463
12	10 28 45.43	1.8197	4 0 55.7	11.434	12	11 56 9.52	1.8467	5 13 44.1	11.449
13	10 30 34.58	1.8188	3 49 29.2	11.448	13	11 58 0.38	1.8488	5 25 10.6	11.435
14	10 32 23.68	1.8179	3 38 1.9	11.462	14	11 59 51.37	1.8510	5 36 36.3	11.420
15	10 34 12.73	1.8171	3 26 33.8	11.475	15	12 1 42.50	1.8533	5 48 1.0	11.404
16	10 36 1.73	1.8163	3 15 4.9	11.487	16	12 3 33.77	1.8557	5 59 24.8	11.388
17	10 37 50.69	1.8157	3 3 35.4	11.498	17	12 5 25.18	1.8580	6 10 47.6	11.371
18	10 39 39.61	1.8151	2 52 5.1	11.511	18	12 7 16.73	1.8605	6 22 9.3	11.353
19	10 41 28.50	1.8145	2 40 34.1	11.521	19	12 9 8.44	1.8631	6 33 29.9	11.334
20	10 43 17.35	1.8140	2 29 2.6	11.531	20	12 11 0.30	1.8656	6 44 49.4	11.316
21	10 45 6.18	1.8136	2 17 30.4	11.541	21	12 12 52.31	1.8683	6 56 7.8	11.297
22	10 46 54.98	1.8132	2 5 57.7	11.549	22	12 14 44.49	1.8711	7 7 25.0	11.276
23	10 48 43.76	1.8129	1 54 24.5	11.557	23	12 16 36.84	1.8738	7 18 40.9	11.254
24	10 50 32.53	1.8127	N. 1 42 50.9	11.564	24	12 18 29.35	1.8767	S. 7 29 55.5	11.233

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 25.					WEDNESDAY 27.				
0	12 18 29.35	1.8767	S. 7 29 53.5	11.233	0	13 53 2.65	2.0832	S. 15 49 15.0	9.240
1	12 20 22.04	1.8797	7 41 8.8	11.210	1	13 55 7.93	2.0908	15 58 27.5	9.176
2	12 22 14.91	1.8827	7 52 20.7	11.187	2	13 57 13.54	2.0964	16 7 36.1	9.111
3	12 24 7.96	1.8857	8 3 31.2	11.163	3	13 59 19.50	2.1022	16 16 40.8	9.044
4	12 26 1.19	1.8888	8 14 40.2	11.138	4	14 1 25.80	2.1079	16 25 41.4	8.977
5	12 27 54.61	1.8920	8 25 47.8	11.113	5	14 3 32.45	2.1138	16 34 38.0	8.908
6	12 29 48.23	1.8953	8 36 53.8	11.087	6	14 5 39.45	2.1196	16 43 30.4	8.838
7	12 31 42.04	1.8985	8 47 58.2	11.060	7	14 7 46.80	2.1254	16 52 18.6	8.768
8	12 33 36.05	1.9019	8 59 1.0	11.033	8	14 9 54.50	2.1313	17 1 2.5	8.696
9	12 35 30.27	1.9053	9 10 2.1	11.004	9	14 12 2.56	2.1373	17 9 42.1	8.623
10	12 37 24.69	1.9088	9 21 1.5	10.975	10	14 14 10.97	2.1432	17 18 17.2	8.548
11	12 39 19.33	1.9124	9 31 59.1	10.945	11	14 16 19.74	2.1492	17 26 47.9	8.473
12	12 41 14.18	1.9160	9 42 54.9	10.915	12	14 18 28.87	2.1552	17 35 14.0	8.397
13	12 43 9.25	1.9198	9 53 48.9	10.883	13	14 20 38.36	2.1613	17 43 35.5	8.319
14	12 45 4.55	1.9235	10 4 40.9	10.851	14	14 22 48.22	2.1673	17 51 52.3	8.241
15	12 47 0.07	1.9273	10 15 31.0	10.818	15	14 24 58.44	2.1734	18 0 4.4	8.161
16	12 48 55.82	1.9312	10 26 19.1	10.784	16	14 27 9.03	2.1796	18 8 11.6	8.079
17	12 50 51.81	1.9351	10 37 5.1	10.750	17	14 29 19.99	2.1858	18 16 13.9	7.997
18	12 52 48.03	1.9391	10 47 49.1	10.715	18	14 31 31.32	2.1918	18 24 11.3	7.914
19	12 54 44.50	1.9432	10 58 30.9	10.678	19	14 33 43.01	2.1979	18 32 3.6	7.829
20	12 56 41.21	1.9473	11 9 10.5	10.642	20	14 35 55.07	2.2042	18 39 50.8	7.743
21	12 58 38.17	1.9514	11 19 47.9	10.604	21	14 38 7.51	2.2104	18 47 32.8	7.657
22	13 0 35.38	1.9556	11 30 23.0	10.565	22	14 40 20.32	2.2166	18 55 9.6	7.568
23	13 2 32.84	1.9599	S. 11 40 55.7	10.525	23	14 42 33.50	2.2228	S. 19 2 41.0	7.478
TUESDAY 26.					THURSDAY 28.				
0	13 4 30.57	1.9643	S. 11 51 26.0	10.485	0	14 44 47.06	2.2291	S. 19 10 7.0	7.388
1	13 6 28.56	1.9688	12 1 53.9	10.444	1	14 47 0.99	2.2353	19 17 27.6	7.297
2	13 8 26.82	1.9733	12 12 19.3	10.402	2	14 49 15.29	2.2415	19 24 42.6	7.204
3	13 10 25.35	1.9778	12 22 42.1	10.358	3	14 51 29.97	2.2478	19 31 52.1	7.111
4	13 12 24.15	1.9823	12 33 2.3	10.315	4	14 53 45.03	2.2541	19 38 55.9	7.015
5	13 14 23.23	1.9870	12 43 19.9	10.271	5	14 56 0.46	2.2603	19 45 53.9	6.918
6	13 16 22.59	1.9918	12 53 34.8	10.225	6	14 58 16.27	2.2666	19 52 46.1	6.820
7	13 18 22.24	1.9965	13 3 46.9	10.178	7	15 0 32.45	2.2728	19 59 32.3	6.721
8	13 20 22.17	2.0013	13 13 56.2	10.131	8	15 2 49.00	2.2790	20 6 12.6	6.621
9	13 22 22.39	2.0061	13 24 2.6	10.083	9	15 5 5.93	2.2853	20 12 46.8	6.519
10	13 24 22.90	2.0110	13 34 6.1	10.033	10	15 7 23.23	2.2915	20 19 14.9	6.417
11	13 26 23.71	2.0160	13 44 6.6	9.983	11	15 9 40.91	2.2978	20 25 36.9	6.313
12	13 28 24.82	2.0210	13 54 4.1	9.933	12	15 11 58.96	2.3039	20 31 52.5	6.208
13	13 30 26.23	2.0261	14 3 58.5	9.880	13	15 14 17.38	2.3102	20 38 1.8	6.102
14	13 32 27.95	2.0313	14 13 49.7	9.827	14	15 16 36.18	2.3165	20 44 4.7	5.994
15	13 34 29.98	2.0365	14 23 37.7	9.773	15	15 18 55.34	2.3228	20 50 1.1	5.885
16	13 36 32.33	2.0417	14 33 22.4	9.718	16	15 21 14.87	2.3286	20 55 50.9	5.775
17	13 38 34.99	2.0469	14 43 3.8	9.666	17	15 23 34.77	2.3347	21 1 34.1	5.664
18	13 40 37.96	2.0523	14 52 41.8	9.604	18	15 25 55.03	2.3408	21 7 10.6	5.552
19	13 42 41.26	2.0577	15 2 16.3	9.546	19	15 28 15.66	2.3468	21 12 40.3	5.438
20	13 44 44.88	2.0631	15 11 47.3	9.488	20	15 30 36.64	2.3528	21 18 3.2	5.323
21	13 46 48.83	2.0685	15 21 14.8	9.428	21	15 32 57.99	2.3588	21 23 19.1	5.208
22	13 48 53.10	2.0740	15 30 38.6	9.366	22	15 35 19.69	2.3647	21 28 28.1	5.091
23	13 50 57.71	2.0796	15 39 58.7	9.303	23	15 37 41.75	2.3706	21 33 30.0	4.972
24	13 53 2.65	2.0852	S. 15 49 15.0	9.240	24	15 40 4.16	2.3764	S. 21 38 24.7	4.852

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 29.					SUNDAY 31.				
0	15 40 4.16	2.3764	S.21 38 24.7	4.852	0	17 39 34.57	2.5671	S.22 54 23.9	1.987
1	15 42 26.92	2.3823	21 43 12.2	4.732	1	17 42 8.64	2.5684	22 52 20.0	2.143
2	15 44 50.03	2.3880	21 47 52.5	4.610	2	17 44 42.78	2.5697	22 50 6.7	2.300
3	15 47 13.48	2.3938	21 52 25.4	4.487	3	17 47 17.00	2.5708	22 47 44.0	2.457
4	15 49 37.28	2.3995	21 56 50.9	4.363	4	17 49 51.28	2.5718	22 45 11.9	2.613
5	15 52 1.42	2.4051	22 1 8.9	4.237	5	17 52 25.62	2.5727	22 42 30.4	2.770
6	15 54 25.89	2.4106	22 5 19.3	4.111	6	17 55 0.00	2.5734	22 39 39.5	2.927
7	15 56 50.69	2.4161	22 9 22.2	3.983	7	17 57 34.43	2.5741	22 36 39.2	3.084
8	15 59 15.82	2.4216	22 13 17.3	3.854	8	18 0 8.89	2.5746	22 33 29.4	3.241
9	16 1 41.28	2.4269	22 17 4.7	3.725	9	18 2 43.38	2.5749	22 30 10.3	3.397
10	16 4 7.05	2.4323	22 20 44.3	3.595	10	18 5 17.88	2.5752	22 26 41.8	3.553
11	16 6 33.15	2.4376	22 24 16.1	3.463	11	18 7 52.40	2.5753	22 23 3.9	3.709
12	16 8 59.56	2.4428	22 27 39.9	3.330	12	18 10 26.92	2.5753	22 19 16.7	3.865
13	16 11 26.28	2.4478	22 30 55.7	3.197	13	18 13 1.44	2.5752	22 15 20.1	4.021
14	16 13 53.30	2.4529	22 34 3.5	3.062	14	18 15 35.95	2.5750	22 11 14.2	4.177
15	16 16 20.63	2.4579	22 37 3.1	2.926	15	18 18 10.44	2.5747	22 6 58.9	4.332
16	16 18 48.25	2.4628	22 39 54.6	2.789	16	18 20 44.91	2.5742	22 2 34.4	4.486
17	16 21 16.16	2.4676	22 42 37.8	2.651	17	18 23 19.34	2.5736	21 58 0.6	4.641
18	16 23 44.36	2.4722	22 45 12.7	2.512	18	18 25 53.74	2.5729	21 53 17.5	4.795
19	16 26 12.83	2.4768	22 47 39.2	2.372	19	18 28 28.09	2.5721	21 48 25.2	4.948
20	16 28 41.58	2.4815	22 49 57.3	2.232	20	18 31 2.39	2.5712	21 43 23.7	5.101
21	16 31 10.61	2.4860	22 52 7.0	2.090	21	18 33 36.63	2.5701	21 38 13.1	5.253
22	16 33 39.90	2.4903	22 54 8.1	1.947	22	18 36 10.80	2.5690	21 32 53.3	5.405
23	16 36 9.45	2.4946	S.22 56 0.6	1.803	23	18 38 44.91	2.5678	S.21 27 24.5	5.556
SATURDAY 30.					MONDAY, JANUARY 1, 1900.				
0	16 38 39.25	2.4988	S.22 57 44.5	1.660	0	18 41 18.93	2.5663	S.21 21 46.6	5.707
1	16 41 9.30	2.5029	22 59 19.8	1.515	PHASES OF THE MOON.				
2	16 43 39.60	2.5069	23 0 46.3	1.368					
3	16 46 10.13	2.5108	23 2 4.0	1.222					
4	16 48 40.89	2.5146	23 3 12.9	1.075					
5	16 51 11.88	2.5183	23 4 13.0	0.928	● New Moon . . . . . Dec. 2 12 47.7 ☾ First Quarter . . . . . 9 9 2.6 ○ Full Moon . . . . . 16 13 31.1 ☾ Last Quarter . . . . . 24 15 57.3				
6	16 53 43.08	2.5218	23 5 4.2	0.778					
7	16 56 14.50	2.5253	23 5 46.4	0.628					
8	16 58 46.12	2.5288	23 6 19.6	0.478					
9	17 1 17.95	2.5321	23 6 43.8	0.328	☾ Perigee . . . . . Dec. 6 18.2 ☾ Apogee . . . . . 22 10.9				
10	17 3 49.97	2.5352	23 6 59.0	0.177					
11	17 6 22.17	2.5382	23 7 5.0	- 0.023					
12	17 8 54.55	2.5412	23 7 2.0	+ 0.127					
13	17 11 27.11	2.5440	23 6 49.8	0.280					
14	17 13 59.83	2.5467	23 6 28.4	0.433					
15	17 16 32.71	2.5493	23 5 57.8	0.588					
16	17 19 5.74	2.5517	23 5 17.9	0.742					
17	17 21 38.91	2.5540	23 4 28.8	0.896					
18	17 24 12.22	2.5563	23 3 30.4	1.051					
19	17 26 45.67	2.5584	23 2 22.7	1.206					
20	17 29 19.23	2.5603	23 1 5.7	1.362					
21	17 31 52.91	2.5622	22 59 39.3	1.518					
22	17 34 26.70	2.5640	22 58 3.5	1.674					
23	17 37 0.59	2.5656	22 56 18.4	1.830					
24	17 39 34.57	2.5671	S.22 54 23.9	1.987					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
4	SUN W.	18 54 43	2632	20 32 55	2624	22 11 18	2617	23 49 50	2610
	Fomalhaut E.	63 53 18	2912	62 21 15	2926	60 49 29	2942	59 18 3	2960
	α Pegasi E.	81 13 48	2442	79 31 13	2437	77 48 31	2433	76 5 43	2429
5	SUN W.	32 4 30	2585	33 43 45	2581	35 23 6	2578	37 2 31	2574
	MARS W.	21 40 20	2502	23 21 31	2497	25 2 48	2494	26 44 10	2490
	Fomalhaut E.	51 48 2	3105	50 19 58	3146	48 52 44	3193	47 26 26	3246
	α Pegasi E.	67 30 47	2423	65 47 45	2424	64 4 45	2426	62 21 47	2429
	α Arietis E.	110 19 44	2293	108 33 34	2289	106 47 19	2285	105 0 58	2283
6	SUN W.	45 20 27	2566	47 0 9	2566	48 39 51	2565	50 19 34	2566
	MARS W.	35 11 52	2482	36 53 31	2482	38 35 10	2481	40 16 50	2481
	VENUS W.	25 14 28	2657	26 52 5	2656	28 29 44	2655	30 7 25	2653
	α Pegasi E.	53 48 33	2460	52 6 24	2470	50 24 29	2482	48 42 50	2495
	α Arietis E.	96 8 20	2273	94 21 41	2272	92 35 1	2272	90 48 21	2272
7	SUN W.	58 37 57	2570	60 17 33	2572	61 57 6	2574	63 36 37	2577
	MARS W.	48 45 0	2486	50 26 33	2487	52 8 4	2489	53 49 32	2492
	VENUS W.	38 16 1	2655	39 53 42	2656	41 31 21	2658	43 8 57	2660
	α Pegasi E.	40 20 16	2597	38 41 17	2626	37 2 58	2660	35 25 25	2699
	α Arietis E.	81 55 12	2278	80 8 40	2279	78 22 10	2282	76 35 44	2285
	Aldebaran E.	114 54 38	2225	113 8 16	2226	111 21 56	2227	109 35 37	2229
8	SUN W.	71 53 16	2591	73 32 23	2594	75 11 26	2599	76 50 23	2602
	MARS W.	62 15 57	2507	63 57 1	2510	65 38 1	2514	67 18 55	2517
	VENUS W.	51 16 13	2674	52 53 28	2677	54 30 39	2681	56 7 45	2684
	α Aquilæ W.	35 47 25	3034	36 59 50	3021	38 14 30	3026	39 31 11	3024
	α Arietis E.	67 44 38	2301	65 58 40	2306	64 12 49	2310	62 27 4	2315
	Aldebaran E.	100 44 45	2300	98 58 45	2303	97 12 50	2306	95 26 59	2309
9	SUN W.	85 3 46	2624	86 42 9	2629	88 20 25	2633	89 58 35	2638
	MARS W.	75 42 2	2538	77 22 22	2543	79 2 35	2548	80 42 41	2553
	VENUS W.	64 11 54	2706	65 48 26	2710	67 24 52	2716	69 1 11	2721
	α Aquilæ W.	46 18 22	3253	47 43 29	3204	49 9 33	3162	50 36 28	3124
	α Arietis E.	53 40 9	2342	51 55 11	2348	50 10 22	2355	48 25 42	2362
	Aldebaran E.	86 39 5	2329	84 53 48	2334	83 8 38	2338	81 23 34	2343
10	SUN W.	98 7 45	2665	99 45 14	2669	101 22 36	2675	102 59 50	2680
	MARS W.	89 1 31	2578	90 40 56	2584	92 20 13	2589	93 59 23	2594
	VENUS W.	77 1 4	2747	78 36 42	2753	80 12 12	2758	81 47 35	2765
	α Aquilæ W.	58 0 56	2990	59 31 21	2973	61 2 8	2957	62 33 15	2942
	α Arietis E.	39 45 10	2405	38 1 42	2415	36 18 28	2426	34 35 30	2439
	Aldebaran E.	72 40 4	2369	70 55 45	2375	69 11 34	2381	67 27 32	2387
	Pollux E.	114 27 8	2408	112 43 45	2412	111 0 27	2415	109 17 13	2419
11	SUN W.	111 4 9	2709	112 40 37	2714	114 16 58	2720	115 53 11	2727
	MARS W.	102 13 19	2623	103 51 43	2629	105 29 58	2635	107 8 6	2641
	VENUS W.	89 42 36	2793	91 17 13	2800	92 51 41	2806	94 26 1	2813
	α Aquilæ W.	70 12 32	2898	71 44 53	2893	73 17 21	2890	74 49 53	2887
	Fomalhaut W.	45 27 48	3394	46 50 11	3345	48 13 31	3300	49 37 43	3259
	Aldebaran E.	58 49 32	2419	57 6 24	2426	55 23 26	2433	53 40 39	2441
	Pollux E.	100 42 30	2441	98 59 53	2445	97 17 22	2450	95 34 59	2455

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
4	SUN	W.	• • •		• • •		• • •		• • •	
	Fomalhaut	E.	25 28 31	2604	27 7 20	2399	28 46 17	2394	30 25 20	2389
	α Pegasi	E.	57 47 0	2981	56 16 24	3007	54 46 20	3035	53 16 51	3068
5			74 22 49	2426	72 39 51	2424	70 56 51	2423	69 13 49	2423
	SUN	W.	38 42 1	2372	40 21 34	2371	42 1 9	2369	43 40 47	2367
	MARS	W.	28 25 37	2488	30 7 7	2486	31 48 40	2485	33 30 15	2483
	Fomalhaut	E.	46 1 11	3306	44 37 6	3372	43 14 18	3449	41 52 57	3536
	α Pegasi	E.	60 38 54	2433	58 56 6	2438	57 13 26	2444	55 30 54	2452
6	α Arietis	E.	103 14 33	2280	101 28 4	2278	99 41 32	2276	97 54 57	2274
	SUN	W.	51 59 16	2366	53 38 58	2366	55 18 39	2367	56 58 19	2369
	MARS	W.	41 58 30	2482	43 40 9	2482	45 21 48	2483	47 3 25	2485
7	VENUS	W.	31 45 8	2653	33 22 51	2652	35 0 35	2653	36 38 18	2655
	α Pegasi	E.	47 1 30	2510	45 20 31	2528	43 39 57	2548	41 59 51	2571
	α Arietis	E.	89 1 41	2272	87 15 1	2274	85 28 23	2275	83 41 47	2276
8	SUN	W.	65 16 4	2579	66 55 28	2582	68 34 48	2585	70 14 4	2588
	MARS	W.	55 30 56	2494	57 12 17	2497	58 53 35	2500	60 34 48	2503
	VENUS	W.	44 46 31	2662	46 24 2	2665	48 1 29	2667	49 38 53	2670
	α Pegasi	E.	33 48 44	2744	32 13 3	2798	30 38 33	2862	29 5 25	2937
	α Arietis	E.	74 49 22	2287	73 3 4	2290	71 16 50	2294	69 30 41	2298
	Aldebaran	E.	107 49 21	2290	106 3 7	2292	104 16 56	2295	102 30 49	2297
9	SUN	W.	78 29 15	2607	80 8 1	2610	81 46 42	2615	83 25 17	2619
	MARS	W.	68 59 44	2522	70 40 27	2525	72 21 5	2530	74 1 37	2535
	VENUS	W.	57 44 46	2688	59 21 42	2692	60 58 32	2697	62 35 16	2701
	α Aquilæ	W.	40 49 41	3215	42 9 49	3437	43 31 24	3367	44 54 18	3306
	α Arietis	E.	60 41 26	2320	58 55 55	2325	57 10 32	2330	55 25 16	2336
	Aldebaran	E.	93 41 13	2313	91 55 32	2317	90 9 57	2321	88 24 28	2325
10	SUN	W.	91 36 39	2643	93 14 36	2648	94 52 26	2653	96 30 9	2658
	MARS	W.	82 22 41	2558	84 2 34	2563	85 42 20	2568	87 21 59	2573
	VENUS	W.	70 37 23	2726	72 13 28	2731	73 49 27	2736	75 25 19	2741
	α Aquilæ	W.	52 4 8	3091	53 32 29	3060	55 1 27	3034	56 30 57	3011
	α Arietis	E.	46 41 13	2369	44 56 54	2378	43 12 47	2386	41 28 52	2395
	Aldebaran	E.	79 38 37	2348	77 53 47	2353	76 9 5	2359	74 24 31	2364
11	SUN	W.	104 36 57	2686	106 13 56	2691	107 50 48	2697	109 27 32	2702
	MARS	W.	95 38 26	2600	97 17 21	2606	98 56 8	2612	100 34 47	2617
	VENUS	W.	83 22 51	2769	84 57 59	2775	86 32 59	2782	88 7 51	2787
	α Aquilæ	W.	64 4 40	2931	65 36 20	2920	67 8 14	2911	68 40 19	2905
	α Arietis	E.	32 52 51	2453	31 10 31	2467	29 28 32	2485	27 46 57	2503
	Aldebaran	E.	65 43 38	2393	63 59 53	2399	62 16 17	2405	60 32 50	2412
	Pollux	E.	107 34 5	2422	105 51 2	2426	104 8 5	2431	102 25 14	2436
	SUN	W.	117 29 15	2733	119 5 11	2739	120 40 59	2745	122 16 39	2752
12	MARS	W.	108 46 5	2647	110 23 56	2654	112 1 38	2660	113 39 12	2666
	VENUS	W.	96 0 12	2819	97 34 15	2825	99 8 10	2832	100 41 56	2839
	α Aquilæ	W.	76 22 29	2886	77 55 6	2885	79 27 44	2887	81 0 20	2887
	Fomalhaut	W.	51 2 43	3223	52 28 25	3192	53 54 44	3163	55 21 37	3139
	Aldebaran	E.	51 58 3	2449	50 15 38	2458	48 33 25	2466	46 51 24	2475
	Pollux	E.	93 52 43	2461	92 10 35	2467	90 28 35	2473	88 46 44	2479



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
12	SUN W.	123 52 10	2759	125 27 32	2765	127 2 46	2772	128 37 51	2779
	VENUS W.	102 15 33	2846	103 49 1	2853	105 22 20	2860	106 55 30	2867
	α Aquilæ W.	82 32 55	2891	84 5 26	2893	85 37 54	2897	87 10 17	2902
	Fomalhaut W.	56 48 59	3118	58 16 47	3098	59 44 59	3082	61 13 31	3067
	Aldebaran E.	45 9 35	2484	43 27 59	2495	41 46 38	2504	40 5 31	2516
	Pollux E.	87 5 1	2485	85 23 27	2491	83 42 1	2498	82 0 45	2505
13	α Aquilæ W.	94 50 14	2939	96 21 43	2950	97 52 59	2961	99 24 1	2972
	Fomalhaut W.	68 39 53	3022	70 9 39	3017	71 39 31	3014	73 9 27	3012
	α Pegasi W.	47 26 11	2723	49 2 20	2718	50 38 36	2714	52 14 57	2711
	Pollux E.	73 36 54	2542	71 56 39	2551	70 16 36	2559	68 36 44	2568
	Regulus E.	110 25 50	2499	108 44 35	2506	107 3 30	2512	105 22 34	2519
14	Fomalhaut W.	80 39 17	3018	82 9 8	3021	83 38 55	3026	85 8 35	3032
	α Pegasi W.	60 17 12	2712	61 53 36	2714	63 29 57	2718	65 6 13	2722
	Pollux E.	60 20 36	2616	58 42 3	2627	57 3 45	2638	55 25 42	2650
	Regulus E.	97 0 20	2556	95 20 24	2564	93 40 39	2572	92 1 5	2580
15	Fomalhaut W.	92 34 47	3073	94 3 29	3085	95 31 57	3096	97 0 11	3110
	α Pegasi W.	73 6 4	2748	74 41 40	2755	76 17 7	2762	77 52 25	2769
	α Arietis W.	29 29 17	2709	31 5 45	2707	32 42 16	2707	34 18 46	2710
	Pollux E.	47 19 37	2716	45 43 19	2732	44 7 22	2748	42 31 46	2766
	Regulus E.	83 46 6	2623	82 7 42	2632	80 29 30	2641	78 51 31	2650
16	α Pegasi W.	85 46 18	2811	87 20 31	2821	88 54 31	2831	90 28 19	2842
	α Arietis W.	42 20 4	2735	43 55 58	2741	45 31 44	2748	47 7 20	2755
	Regulus E.	70 44 49	2700	69 8 9	2710	67 31 42	2720	65 55 29	2732
17	α Pegasi W.	98 13 54	2895	99 46 19	2907	101 18 29	2919	102 50 24	2931
	α Arietis W.	55 2 47	2797	56 37 19	2805	58 11 40	2815	59 45 48	2824
	Aldebaran W.	22 30 52	2947	24 2 11	2935	25 33 45	2927	27 5 29	2923
	Regulus E.	57 57 59	2785	56 23 12	2797	54 48 40	2808	53 14 23	2820
	Spica E.	111 53 57	2763	110 18 41	2773	108 43 38	2783	107 8 48	2794
18	α Arietis W.	67 33 31	2871	69 6 27	2880	70 39 11	2891	72 11 42	2900
	Aldebaran W.	34 44 49	2927	36 16 34	2930	37 48 15	2935	39 19 50	2940
	Regulus E.	45 26 46	2880	43 54 1	2892	42 21 32	2905	40 49 19	2918
	Spica E.	99 18 1	2845	97 44 31	2855	96 11 15	2866	94 38 12	2875
19	α Arietis W.	79 51 17	2946	81 22 37	2956	82 53 45	2965	84 24 42	2973
	Aldebaran W.	46 55 53	2972	48 26 41	2979	49 57 20	2986	51 27 50	2993
	Spica E.	86 56 4	2924	85 24 16	2933	83 52 39	2942	82 21 14	2951
20	α Arietis W.	91 56 44	3015	93 26 38	3023	94 56 22	3031	96 25 56	3038
	Aldebaran W.	58 58 12	3027	60 27 51	3034	61 57 22	3040	63 26 45	3047
	Spica E.	74 46 54	2993	73 16 33	3001	71 46 21	3009	70 16 19	3016
	JUPITER E.	111 15 24	3070	109 46 38	3078	108 18 1	3085	106 49 33	3091
21	α Arietis W.	103 51 42	3070	105 20 28	3076	106 49 7	3081	108 17 40	3087
	Aldebaran W.	70 51 51	3074	72 20 32	3078	73 49 8	3083	75 17 38	3087
	Pollux W.	29 51 54	3280	31 16 29	3266	32 41 20	3253	34 6 26	3242
	Spica E.	62 48 16	3047	61 19 2	3052	59 49 54	3058	58 20 53	3062

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
12	SUN W.	130 12 46	2785	131 47 33	2793	133 22 10	2800	134 56 38	2807
	VENUS W.	108 28 31	2875	110 1 22	2882	111 34 4	2890	113 6 36	2898
	α Aquilæ W.	88 42 33	2908	90 14 42	2915	91 46 42	2922	93 18 33	2930
	Fomalhaut W.	62 42 21	3054	64 11 27	3044	65 40 45	3035	67 10 14	3027
	Aldebaran E.	38 24 40	2527	36 44 5	2541	35 3 49	2555	33 23 52	2570
	Pollux E.	80 19 39	2512	78 38 42	2520	76 57 56	2527	75 17 20	2534
13	α Aquilæ W.	100 54 49	2985	102 25 21	2999	103 55 35	3014	105 25 31	3029
	Fomalhaut W.	74 39 25	3010	76 9 25	3011	77 39 24	3012	79 9 22	3014
	α Pegasi W.	53 51 22	2710	55 27 49	2709	57 4 17	2708	58 40 45	2710
	Pollux E.	66 57 5	2577	65 17 38	2586	63 38 24	2596	61 59 23	2606
	Regulus E.	103 41 47	2826	102 1 10	2833	100 20 43	2840	98 40 26	2848
14	Fomalhaut W.	86 38 8	3039	88 7 33	3047	89 36 48	3055	91 5 53	3064
	α Pegasi W.	66 42 24	2726	68 18 29	2731	69 54 28	2736	71 30 20	2742
	Pollux E.	53 47 55	2662	52 10 24	2675	50 33 10	2688	48 56 14	2702
	Regulus E.	90 21 42	2888	88 42 30	2896	87 3 30	2905	85 24 42	2914
15	Fomalhaut W.	98 28 9	3123	99 55 51	3137	101 23 16	3152	102 50 23	3168
	α Pegasi W.	79 27 33	2777	81 2 31	2785	82 37 18	2794	84 11 54	2803
	α Arietis W.	35 55 13	2713	37 31 35	2717	39 7 52	2722	40 44 2	2729
	Pollux E.	40 56 34	2785	39 21 46	2805	37 47 24	2825	36 13 29	2848
	Regulus E.	77 13 44	2660	75 36 10	2670	73 58 50	2680	72 21 43	2689
16	α Pegasi W.	92 1 53	2852	93 35 14	2862	95 8 21	2873	96 41 15	2884
	α Arietis W.	48 42 47	2763	50 18 3	2771	51 53 9	2779	53 28 4	2788
	Regulus E.	64 19 31	2741	62 43 46	2753	61 8 16	2763	59 33 0	2775
17	α Pegasi W.	104 22 3	2943	105 53 27	2956	107 24 35	2969	108 55 27	2981
	α Arietis W.	61 19 45	2834	62 53 29	2842	64 27 2	2852	66 0 23	2862
	Aldebaran W.	28 37 19	2920	30 9 13	2920	31 41 7	2921	33 12 59	2923
	Regulus E.	51 40 21	2831	50 6 34	2844	48 33 3	2855	46 59 47	2867
	Spica E.	105 34 12	2804	103 59 49	2815	102 25 40	2825	100 51 44	2835
18	α Arietis W.	73 44 1	2909	75 16 8	2919	76 48 3	2928	78 19 46	2938
	Aldebaran W.	40 51 18	2946	42 22 39	2952	43 53 52	2958	45 24 57	2965
	Regulus E.	39 17 23	2931	37 45 43	2944	36 14 20	2958	34 43 15	2972
	Spica E.	93 5 21	2885	91 32 43	2895	90 0 18	2905	88 28 5	2914
19	α Arietis W.	85 55 28	2982	87 26 3	2991	88 56 27	2999	90 26 41	3008
	Aldebaran W.	52 58 12	3000	54 28 25	3007	55 58 29	3014	57 28 25	3021
	Spica E.	80 50 0	2961	79 18 58	2969	77 48 6	2977	76 17 25	2985
20	α Arietis W.	97 55 22	3045	99 24 39	3052	100 53 48	3058	102 22 49	3065
	Aldebaran W.	64 56 0	3052	66 25 8	3058	67 54 9	3064	69 23 3	3069
	Spica E.	68 46 26	3022	67 16 41	3030	65 47 5	3036	64 17 37	3042
	JUPITER E.	105 21 13	3099	103 53 2	3105	102 24 58	3111	100 57 2	3118
21	α Arietis W.	109 46 6	3091	111 14 27	3096	112 42 42	3099	114 10 53	3103
	Aldebaran W.	76 46 4	3091	78 14 25	3094	79 42 42	3097	81 10 55	3100
	Pollux W.	35 31 45	2834	36 57 14	2826	38 22 52	2820	39 48 37	2813
	Spica E.	56 51 57	3067	55 23 7	3070	53 54 21	3074	52 25 40	3077

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
21	JUPITER E.	99 29 14	3123	98 1 32	3129	96 33 57	3133	95 6 27	3138
	Antares E.	108 17 24	3051	106 48 14	3056	105 19 11	3061	103 50 14	3065
	SUN E.	129 43 42	3430	128 21 59	3435	127 0 22	3440	125 38 51	3445
22	Aldebaran W.	82 39 5	3102	84 7 12	3104	85 35 17	3105	87 3 20	3106
	Pollux W.	41 14 31	3208	42 40 31	3203	44 6 37	3198	45 32 49	3193
	Spica E.	50 57 2	3080	49 28 28	3082	47 59 57	3084	46 31 28	3086
	JUPITER E.	87 50 11	3134	86 23 7	3136	84 56 5	3138	83 29 5	3138
	Antares E.	96 26 38	3082	94 58 6	3083	93 29 36	3085	92 1 8	3086
	SUN E.	118 52 29	3463	117 31 24	3465	116 10 21	3468	114 49 21	3469
23	Aldebaran W.	94 23 25	3105	95 51 28	3105	97 19 32	3102	98 47 39	3101
	Pollux W.	52 45 14	3169	54 12 0	3164	55 38 52	3159	57 5 50	3154
	Spica E.	39 9 22	3087	37 40 57	3087	36 12 31	3085	34 44 3	3084
	JUPITER E.	76 14 15	3158	74 47 15	3156	73 20 13	3154	71 53 9	3152
	Antares E.	84 38 59	3086	83 10 32	3083	81 42 2	3082	80 13 30	3079
	SUN E.	108 4 30	3468	106 43 30	3466	105 22 28	3464	104 1 24	3461
24	Pollux W.	64 22 22	3123	65 50 4	3116	67 17 54	3109	68 45 53	3101
	Regulus W.	27 20 52	3138	28 48 15	3125	30 15 54	3113	31 43 48	3100
	JUPITER E.	64 36 51	3132	63 9 20	3126	61 41 42	3120	60 13 57	3113
	Antares E.	72 49 54	3060	71 20 55	3055	69 51 50	3048	68 22 37	3043
	SUN E.	97 15 3	3439	95 53 31	3433	94 31 52	3427	93 10 6	3420
25	Pollux W.	76 8 23	3056	77 37 27	3046	79 6 43	3035	80 36 12	3024
	Regulus W.	39 7 3	3040	40 36 26	3028	42 6 4	3016	43 35 57	3003
	JUPITER E.	52 52 59	3074	51 24 18	3065	49 55 25	3055	48 26 20	3045
	Antares E.	60 54 27	3004	59 24 19	2995	57 54 0	2985	56 23 29	2976
	SUN E.	86 19 5	3377	84 56 22	3367	83 33 28	3356	82 10 21	3345
26	Pollux W.	88 7 8	2965	89 38 4	2953	91 9 16	2939	92 40 45	2926
	Regulus W.	51 9 24	2937	52 40 56	2923	54 12 46	2909	55 44 54	2894
	JUPITER E.	40 57 39	2989	39 27 12	2976	37 56 29	2963	36 25 30	2950
	Antares E.	48 47 40	2920	47 15 47	2909	45 43 39	2896	44 11 15	2883
	SUN E.	75 11 24	3282	73 46 52	3268	72 22 3	3253	70 56 57	3240
27	Pollux W.	100 22 33	2855	101 55 50	2840	103 29 26	2825	105 3 21	2810
	Regulus W.	63 30 20	2818	65 4 25	2801	66 38 52	2785	68 13 40	2768
	Antares E.	36 25 6	2817	34 51 0	2804	33 16 37	2790	31 41 56	2776
	SUN E.	63 47 1	3160	62 20 4	3143	60 52 47	3126	59 25 9	3110
28	Regulus W.	76 13 13	2683	77 50 16	2666	79 27 42	2648	81 5 32	2631
	Spica W.	22 10 24	2689	23 47 19	2668	25 24 42	2649	27 2 31	2629
	SUN E.	52 1 40	3019	50 31 51	3001	49 1 40	2982	47 31 5	2964
29	Regulus W.	89 20 38	2543	91 0 51	2525	92 41 29	2508	94 22 31	2492
	Spica W.	35 18 9	2535	36 58 33	2517	38 39 23	2499	40 20 38	2481
	SUN E.	39 52 19	2871	38 19 23	2852	36 46 3	2835	35 12 20	2817
30	Regulus W.	102 53 34	2409	104 36 56	2393	106 20 41	2378	108 4 48	2363
	Spica W.	48 53 3	2396	50 36 44	2379	52 20 49	2363	54 5 17	2347
	SUN E.	27 17 59	2731	25 42 0	2714	24 5 39	2699	22 28 58	2685

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
21	JUPITER E.	93 39 3	3148	92 11 44	3145	90 44 29	3148	89 17 18	3132
	Antares E.	102 21 22	3069	100 52 35	3073	99 23 52	3076	97 55 13	3079
	SUN E.	124 17 25	3450	122 56 5	3454	121 34 49	3457	120 13 37	3461
22	Aldebaran W.	88 31 22	3107	89 59 23	3108	91 27 23	3107	92 55 24	3107
	Pollux W.	46 59 7	3188	48 25 30	3183	49 51 59	3178	51 18 34	3174
	Spica E.	45 3 1	3087	43 34 36	3087	42 6 11	3088	40 37 47	3087
	JUPITER E.	82 2 6	3159	80 35 8	3160	79 8 11	3159	77 41 13	3159
	Antares E.	90 32 41	3087	89 4 15	3087	87 35 50	3087	86 7 25	3087
	SUN E.	113 28 22	3470	112 7 24	3470	110 46 26	3470	109 25 28	3470
23	Aldebaran W.	100 15 48	3097	101 44 1	3095	103 12 17	3091	104 40 38	3087
	Pollux W.	58 32 54	3148	60 0 5	3143	61 27 23	3136	62 54 49	3130
	Spica E.	33 15 34	3082	31 47 2	3079	30 18 27	3077	28 49 49	3073
	JUPITER E.	70 26 2	3148	68 58 51	3145	67 31 36	3141	66 4 16	3137
	Antares E.	78 44 55	3077	77 16 17	3073	75 47 34	3069	74 18 47	3065
	SUN E.	102 40 16	3458	101 19 5	3454	99 57 49	3450	98 36 29	3445
24	Pollux W.	70 14 2	3092	71 42 21	3083	73 10 51	3075	74 39 31	3065
	Regulus W.	33 11 58	3088	34 40 22	3076	36 9 1	3064	37 37 55	3052
	JUPITER E.	58 46 3	3106	57 18 1	3099	55 49 50	3091	54 21 30	3082
	Antares E.	66 53 17	3055	65 23 48	3029	63 54 11	3021	62 24 24	3013
	SUN E.	91 48 12	3413	90 26 10	3404	89 3 58	3396	87 41 37	3386
25	Pollux W.	82 5 55	3014	83 35 51	3001	85 6 2	2990	86 36 27	2977
	Regulus W.	45 6 6	2990	46 36 31	2977	48 7 12	2964	49 38 10	2951
	JUPITER E.	46 57 3	3034	45 27 33	3023	43 57 49	3012	42 27 51	3001
	Antares E.	54 52 46	2965	53 21 50	2955	51 50 41	2944	50 19 18	2932
	SUN E.	80 47 2	3333	79 23 29	3321	77 59 42	3309	76 35 41	3295
26	Pollux W.	94 12 31	2918	95 44 35	2898	97 16 56	2884	98 49 35	2869
	Regulus W.	57 17 20	2880	58 50 5	2864	60 23 10	2848	61 56 35	2833
	JUPITER E.	34 54 15	2937	33 22 43	2924	31 50 55	2910	30 18 49	2897
	Antares E.	42 38 35	2870	41 5 38	2858	39 32 25	2844	37 58 54	2831
	SUN E.	69 31 35	3225	68 5 55	3209	66 39 56	3193	65 13 38	3177
27	Pollux W.	106 37 36	2795	108 12 11	2779	109 47 6	2764	111 22 21	2749
	Regulus W.	69 48 50	2751	71 24 22	2735	73 0 16	2717	74 36 33	2700
	Antares E.	30 6 57	2763	28 31 40	2750	26 56 7	2738	25 20 17	2726
	SUN E.	57 57 11	3091	56 28 51	3074	55 0 10	3056	53 31 6	3038
28	Regulus W.	82 43 45	2613	84 22 22	2596	86 1 23	2578	87 40 48	2560
	Spica W.	28 40 47	2610	30 19 29	2591	31 58 37	2572	33 38 10	2553
	SUN E.	46 0 7	2945	44 28 45	2927	42 57 0	2908	41 24 51	2890
29	Regulus W.	96 3 56	2475	97 45 45	2458	99 27 58	2441	101 10 34	2424
	Spica W.	42 2 18	2463	43 44 23	2446	45 26 52	2429	47 9 45	2412
	SUN E.	33 38 14	2799	32 3 45	2781	30 28 52	2764	28 53 37	2747
30	Regulus W.	109 49 16	2348	111 34 6	2334	113 19 16	2320	115 4 47	2307
	Spica W.	55 50 8	2332	57 35 21	2317	59 20 56	2302	61 6 52	2287
	SUN E.	20 51 58	2672	19 14 40	2659	17 37 5	2648	15 59 15	2638

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	17 24 20.70	+ 0.235	-20 12 46.2	-13.00	22 37.3	1	19 48 25.88	+16.110	-22 19 46.3	+ 26.30	23 5.0
2	17 24 44.88	1.739	20 18 45.5	16.81	22 34.3	2	19 54 53.60	16.199	22 8 35.7	29.39	23 7.5
3	17 25 44.20	3.164	20 26 8.3	19.98	22 31.9	3	20 1 23.38	16.282	21 56 5.6	32.92	23 10.1
4	17 27 15.78	4.444	20 34 39.7	22.54	22 29.9	4	20 7 55.06	16.358	21 42 15.2	36.28	23 12.7
5	17 29 16.78	5.616	20 44 5.3	24.50	22 28.4	5	20 14 28.50	16.428	21 27 4.1	39.65	23 15.4
6	17 31 44.47	+ 6.674	-20 54 11.3	-25.91	22 27.3	6	20 21 3.55	+16.493	-21 10 31.8	+ 43.05	23 18.0
7	17 34 36.31	7.630	21 4 44.9	26.81	22 26.6	7	20 27 40.11	16.553	20 52 37.4	46.48	23 20.7
8	17 37 49.97	8.493	21 15 34.3	27.24	22 26.2	8	20 34 18.07	16.610	20 33 20.9	49.91	23 23.4
9	17 41 23.30	9.271	21 26 28.9	27.25	22 26.1	9	20 40 57.35	16.660	20 12 41.8	53.36	23 26.2
10	17 45 14.38	9.973	21 37 19.1	26.88	22 26.3	10	20 47 37.85	16.712	19 50 39.5	56.83	23 28.9
11	17 49 21.46	+10.606	-21 47 56.2	-26.16	22 26.6	11	20 54 19.49	+16.758	-19 27 13.8	+ 60.31	23 31.7
12	17 53 42.98	11.178	21 58 12.5	25.15	22 27.3	12	21 1 2.23	16.803	19 2 24.4	63.80	23 34.5
13	17 58 17.56	11.695	22 8 1.1	23.86	22 28.1	13	21 7 46.02	16.845	18 36 11.1	67.90	23 37.3
14	18 3 3.95	12.163	22 17 15.9	22.34	22 29.1	14	21 14 30.80	16.886	18 8 33.8	70.81	23 40.1
15	18 8 1.05	12.588	22 25 52.0	20.62	22 30.2	15	21 21 16.55	16.926	17 39 32.1	74.33	23 43.0
16	18 13 7.86	+12.973	-22 33 44.4	-18.71	22 31.5	16	21 28 3.23	+16.964	-17 9 6.1	+ 77.84	23 45.8
17	18 18 23.49	13.324	22 40 48.6	16.62	22 33.0	17	21 34 50.83	17.002	16 37 15.6	81.36	23 48.7
18	18 23 47.16	13.644	22 47 0.8	14.38	22 34.6	18	21 41 39.34	17.040	16 4 0.7	84.88	23 51.6
19	18 29 18.16	13.935	22 52 17.6	12.00	22 36.3	19	21 48 28.75	17.078	15 29 21.5	88.39	23 54.5
20	18 34 55.84	14.201	22 56 36.1	9.52	22 38.0	20	21 55 19.07	17.115	14 53 18.0	91.89	23 57.4
21	18 40 39.61	+14.443	-22 59 53.6	- 6.92	22 39.9	21	22 2 10.29	+17.153	-14 15 50.6	+ 95.38	
22	18 46 28.96	14.666	23 2 7.6	4.23	22 41.9	22	22 9 2.40	17.190	13 36 59.8	98.85	0 0.4
23	18 52 23.45	14.872	23 3 15.9	- 1.45	22 43.9	23	22 15 55.42	17.227	12 56 46.0	102.29	0 3.3
24	18 58 22.65	15.060	23 3 16.6	+ 1.40	22 46.0	24	22 22 49.32	17.264	12 15 10.0	105.70	0 6.3
25	19 4 26.17	15.232	23 2 7.9	4.33	22 48.2	25	22 29 44.10	17.300	11 32 12.7	109.06	0 9.2
26	19 10 33.66	+15.390	-22 59 48.2	+ 7.32	22 50.5	26	22 36 39.71	+17.334	-10 47 55.1	+112.37	0 12.2
27	19 16 44.80	15.536	22 56 16.1	10.37	22 52.8	27	22 43 36.13	17.366	10 2 19.7	115.61	0 15.2
28	19 22 59.30	15.670	22 51 30.1	13.47	22 55.1	28	22 50 33.27	17.395	9 15 27.4	118.75	0 18.2
29	19 29 16.89	15.794	22 45 29.2	16.61	22 57.5	29	22 57 31.04	17.418	8 27 20.8	121.78	0 21.3
30	19 35 37.33	15.908	22 38 12.3	19.81	22 59.9	30	23 4 29.30	17.435	7 38 2.9	124.68	0 24.3
31	19 42 0.40	+16.013	-22 29 38.2	+23.04	23 2.4	31	23 11 27.86	+17.443	- 6 47 37.2	+127.43	0 27.3
32	19 48 25.88	+16.110	-22 19 46.3	+26.30	23 5.0	32	23 18 26.48	+17.440	- 5 56 7.7	+129.99	0 30.4
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th.					
Semidiameter . 4.2 3.7 3.3 3.1 2.8 2.7 2.6						Semidiameter . 2.5 2.4 2.4 2.4 2.4					
Hor. Parallax . 11.0 9.8 8.8 8.1 7.6 7.2 6.9						Hor. Parallax . 6.6 6.5 6.4 6.4 6.4					

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	22 57 31.04	+17.418	- 8 27 20.8	+121.78	0 21.3	1	1 34 41.42	+0.722	+13 22 29.6	+ 9.90	0 56.0
2	23 4 29.30	17.435	7 38 2.9	124.68	0 24.3	2	1 34 46.33	-0.306	13 24 29.6	+ 0.10	0 52.2
3	23 11 27.86	17.443	6 47 37.2	127.43	0 27.3	3	1 34 27.08	1.290	13 22 35.2	- 9.62	0 47.9
4	23 18 26.48	17.440	5 56 7.7	129.99	0 30.4	4	1 33 44.89	2.216	13 16 49.6	19.14	0 43.3
5	23 24 24.89	17.422	5 3 39.4	132.32	0 33.4	5	1 32 41.31	3.069	13 7 18.7	28.38	0 38.3
6	23 32 22.68	+17.389	- 4 10 18.2	+134.40	0 36.4	6	1 31 18.24	-3.838	+12 54 11.0	-37.18	0 32.9
7	23 39 19.40	17.334	3 16 10.8	136.16	0 39.4	7	1 29 37.87	4.509	12 37 38.3	45.44	0 27.3
8	23 46 14.51	17.253	2 21 25.1	137.58	0 42.4	8	1 27 42.67	5.072	12 17 55.3	53.01	0 21.5
9	23 53 7.30	17.142	1 26 10.1	138.59	0 45.4	9	1 25 35.34	5.517	11 55 20.3	59.76	0 15.5
10	23 59 57.03	16.996	- 0 30 36.3	139.15	0 48.3	10	1 23 18.77	5.842	11 30 14.4	65.57	0 9.3
11	0 6 42.78	+16.810	+ 0 25 5.2	+139.22	0 51.1	11	1 20 55.96	-6.038	+11 3 1.5	-70.32	{ 0 3.0 23 56.6
12	0 13 23.52	16.576	1 20 41.6	138.72	0 53.8	12	1 18 29.96	6.108	10 34 7.9	73.95	23 50.3
13	0 19 58.09	16.294	2 15 59.2	137.64	0 56.4	13	1 16 3.78	6.054	10 4 1.6	76.40	23 44.0
14	0 26 25.21	15.956	3 10 43.1	135.92	0 58.9	14	1 13 40.29	5.884	9 33 10.3	77.66	23 37.8
15	0 32 43.53	15.560	4 4 38.0	133.54	1 1.3	15	1 11 22.24	5.604	9 2 3.2	77.73	23 31.7
16	0 38 51.58	+15.100	+ 4 57 27.8	+130.49	1 3.5	16	1 9 12.11	-5.225	+ 8 31 8.2	-76.68	23 25.7
17	0 44 47.83	14.576	5 48 56.2	126.76	1 5.5	17	1 7 12.14	4.760	8 0 51.1	74.58	23 20.0
18	0 50 30.71	13.986	6 38 46.8	122.34	1 7.3	18	1 5 24.21	4.223	7 31 36.1	71.52	23 14.5
19	0 55 58.64	13.330	7 26 43.5	117.27	1 8.8	19	1 3 49.93	3.624	7 3 44.8	67.62	23 9.3
20	1 1 10.07	12.610	8 12 30.9	111.57	1 10.0	20	1 2 30.59	2.977	6 37 35.9	63.00	23 4.3
21	1 6 3.49	+11.830	+ 8 55 54.2	+105.28	1 10.9	21	1 1 27.18	-2.300	+ 6 13 25.5	-57.78	22 59.6
22	1 10 37.46	10.991	9 36 39.9	98.44	1 11.5	22	1 0 40.42	1.597	5 51 26.3	52.09	22 55.2
23	1 14 50.64	10.098	10 14 35.3	91.10	1 11.8	23	1 0 10.72	0.878	5 31 47.8	46.06	22 51.0
24	1 18 41.78	9.156	10 49 28.9	83.30	1 11.7	24	0 59 58.33	-0.154	5 14 37.3	39.78	22 47.1
25	1 22 9.79	8.172	11 21 10.2	75.08	1 11.2	25	1 0 3.29	+0.566	4 59 59.8	33.33	22 43.5
26	1 25 13.72	+ 7.151	+11 49 30.0	+ 66.51	1 10.3	26	1 0 25.46	+1.279	+ 4 47 58.1	-26.81	22 40.2
27	1 27 52.80	6.101	12 14 20.0	57.61	1 9.0	27	1 1 4.60	1.979	4 38 32.9	20.29	22 37.2
28	1 30 6.40	5.030	12 35 33.0	48.44	1 7.3	28	1 2 0.34	2.663	4 31 43.6	13.83	22 34.4
29	1 31 54.13	3.946	12 53 3.0	39.02	1 5.1	29	1 3 12.27	3.328	4 27 28.3	7.46	22 32.0
30	1 33 15.79	2.859	13 6 44.7	29.42	1 2.5	30	1 4 39.91	3.972	4 25 44.3	- 1.23	22 29.7
31	1 34 11.45	+ 1.781	+13 16 34.4	+ 19.70	0 59.5	31	1 6 22.72	+4.593	+ 4 26 27.9	+ 4.83	22 27.7
32	1 34 41.42	+ 0.722	+13 22 29.6	+ 9.90	0 56.0	32	1 8 20.19	+5.193	+ 4 29 34.9	+10.71	22 25.9

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . . .	2.5	2.6	2.8	3.0	3.5	4.0	Semidiameter . . .	4.6	5.3	5.7	5.8	5.6	5.2
Hor. Parallax . . .	6.6	6.8	7.3	8.0	9.1	10.6	Hor. Parallax . . .	12.3	13.9	15.1	15.4	14.9	13.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	1 6 22.72	+ 4.593	+ 4 26 27.9	+ 4.83	22 27.7	1	3 34 30.18	+18.937	+17 52 36.0	+91.82	22 59.1
2	1 8 20.19	5.193	4 29 34.9	10.71	22 25.9	2	3 42 10.78	19.446	18 29 6.8	90.67	23 3.0
3	1 10 31.80	5.771	4 35 0.8	16.40	22 24.4	3	3 50 3.60	19.955	19 5 4.9	89.10	23 7.2
4	1 12 57.01	6.327	4 42 40.7	21.88	22 23.1	4	3 58 8.61	20.461	19 40 19.8	87.05	23 11.5
5	1 15 35.32	6.862	4 52 29.4	27.14	22 22.0	5	4 6 25.65	20.958	20 14 40.6	84.58	23 16.0
6	1 18 26.25	+ 7.378	+ 5 4 21.9	+32.19	22 21.1	6	4 14 54.47	+21.441	+20 47 55.7	+81.59	23 20.8
7	1 21 29.35	7.877	5 18 12.9	37.02	22 20.4	7	4 23 34.64	21.903	21 19 53.1	78.10	23 25.7
8	1 24 44.20	8.358	5 33 57.4	41.64	22 19.9	8	4 32 25.60	22.338	21 50 20.6	74.10	23 30.8
9	1 28 10.40	8.823	5 51 30.2	46.05	22 19.5	9	4 41 26.59	22.738	22 19 5.8	69.59	23 36.0
10	1 31 47.62	9.276	6 10 46.4	50.26	22 19.4	10	4 50 36.67	23.095	22 45 56.7	64.58	23 41.4
11	1 35 35.56	+ 9.717	+ 6 31 41.0	+54.26	22 19.4	11	4 59 54.77	+23.404	+23 10 41.7	+59.10	23 46.9
12	1 39 33.96	10.147	6 54 9.4	58.07	22 19.6	12	5 9 19.61	23.657	23 33 10.3	53.80	23 52.5
13	1 43 42.58	10.570	7 18 6.7	61.68	22 20.0	13	5 18 49.81	23.850	23 53 12.6	46.92	23 58.1
14	1 48 1.25	10.985	7 43 28.4	65.10	22 20.5	14	5 28 23.88	23.978	24 10 40.3	40.34	
15	1 52 29.83	11.396	8 10 10.0	68.34	22 21.1	15	5 38 0.25	24.040	24 25 27.0	33.58	0 3.8
16	1 57 8.23	+11.803	+ 8 38 7.0	+71.39	22 22.0	16	5 47 37.28	+24.035	+24 37 27.9	+26.54	0 9.5
17	2 1 56.38	12.209	9 7 15.1	74.25	22 23.0	17	5 57 13.39	23.964	24 46 40.1	19.47	0 15.2
18	2 6 54.26	12.615	9 37 29.8	76.94	22 24.2	18	6 6 47.03	23.829	24 53 2.4	12.39	0 20.8
19	2 12 1.89	13.022	10 8 46.9	79.45	22 25.5	19	6 16 16.71	23.635	24 56 35.2	+ 5.57	0 26.4
20	2 17 19.33	13.432	10 41 1.9	81.77	22 27.0	20	6 25 41.06	23.386	24 57 21.0	- 1.52	0 31.9
21	2 22 46.65	+13.846	+11 14 10.2	+83.90	22 28.7	21	6 34 58.88	+23.090	+24 55 23.5	- 8.23	0 37.3
22	2 28 23.99	14.266	11 48 7.2	85.85	22 30.5	22	6 44 9.06	22.751	24 50 47.6	14.71	0 42.5
23	2 34 11.47	14.692	12 22 48.4	87.56	22 32.5	23	6 53 10.63	22.574	24 43 39.3	20.92	0 47.6
24	2 40 9.29	15.128	12 58 8.6	89.08	22 34.7	24	7 2 2.76	21.967	24 34 5.5	26.84	0 52.6
25	2 46 17.66	15.571	13 34 2.5	90.58	22 37.1	25	7 10 44.84	21.535	24 22 13.3	32.45	0 57.3
26	2 52 36.77	+16.024	+14 10 24.8	+91.45	22 39.7	26	7 19 16.30	+21.084	+24 8 10.6	-37.72	1 1.9
27	2 59 6.85	16.486	14 47 9.8	92.26	22 42.4	27	7 27 36.72	20.616	23 52 5.3	42.67	1 6.3
28	3 5 48.18	16.959	15 24 11.0	92.80	22 45.3	28	7 35 45.78	20.137	23 34 5.1	47.28	1 10.5
29	3 12 40.95	17.441	16 1 21.7	93.05	22 48.5	29	7 43 43.25	19.651	23 14 18.3	51.56	1 14.5
30	3 19 45.40	17.932	16 38 34.7	92.99	22 51.8	30	7 51 28.98	19.159	22 52 52.8	55.51	1 18.4
31	3 27 1.77	+18.422	+17 15 42.3	+92.59	22 55.3	31	7 59 2.88	+18.665	+22 29 56.3	-59.14	1 22.0
32	3 34 30.18	+18.937	+17 52 36.0	+91.82	22 59.1	32	8 6 24.90	+18.170	+22 5 36.5	-62.47	1 25.3
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th. 30th.					
Semidiameter . 4.8 4.3 3.9 3.6 3.3 3.0 2.8						Semidiameter . . . 2.6 2.5 2.5 2.6 2.7 2.8					
Hor. Parallax . 12.7 11.5 10.4 9.5 8.7 8.0 7.5						Hor. Parallax . . . 7.0 6.8 6.7 6.8 7.0 7.4					

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 59 2.88	+18.665	+22 29 56.3	-59.14	1 22.0	1	10 15 32.52	+2.372	+ 7 34 26.7	-46.48	1 35.9
2	8 6 24.90	18.170	22 5 36.5	62.47	1 25.3	2	10 16 20.79	1.647	7 16 47.3	41.74	1 32.7
3	8 13 35.05	17.676	21 40 0.2	65.49	1 28.6	3	10 16 51.40	0.902	7 1 6.0	36.64	1 29.2
4	8 20 33.39	17.185	21 13 15.1	68.22	1 31.6	4	10 17 3.89	+0.138	6 47 31.7	31.16	1 25.5
5	8 27 19.94	16.695	20 45 27.8	70.67	1 34.4	5	10 16 57.88	-0.641	6 36 13.1	25.32	1 21.4
6	8 33 54.78	+16.209	+20 16 44.9	-72.85	1 37.1	6	10 16 33.04	-1.430	+ 6 27 18.9	-19.13	1 17.1
7	8 40 17.99	15.724	19 47 12.8	74.78	1 39.6	7	10 15 49.19	2.224	6 20 57.4	12.61	1 12.4
8	8 46 29.64	15.244	19 16 57.6	76.45	1 41.8	8	10 14 46.34	3.011	6 17 16.2	- 5.78	1 7.4
9	8 52 29.80	14.768	18 46 5.1	77.88	1 43.8	9	10 13 24.68	3.790	6 16 21.9	+ 1.30	1 2.1
10	8 58 18.55	14.294	18 14 41.3	79.07	1 45.7	10	10 11 44.64	4.541	6 18 19.9	8.56	0 56.5
11	9 3 55.94	+13.822	+17 42 51.6	-80.03	1 47.4	11	10 9 46.98	-5.255	+ 6 23 13.6	+15.93	0 50.6
12	9 9 22.00	13.350	17 10 41.7	80.76	1 48.8	12	10 7 32.81	5.917	6 31 4.4	23.30	0 44.5
13	9 14 36.74	12.878	16 38 16.8	81.28	1 50.1	13	10 5 3.58	6.508	6 41 50.9	30.55	0 38.1
14	9 19 40.19	12.407	16 5 42.1	81.58	1 51.2	14	10 2 21.13	7.014	6 55 29.0	37.57	0 31.5
15	9 24 32.32	11.935	15 33 2.8	81.66	1 52.1	15	9 59 27.73	7.416	7 11 51.2	44.20	0 24.6
16	9 29 13.06	+11.460	+15 0 24.1	-81.52	1 52.8	16	9 56 26.10	-7.698	+ 7 30 46.1	+50.28	0 17.7
17	9 33 42.35	10.980	14 27 51.3	81.18	1 53.3	17	9 53 19.27	7.847	7 51 59.0	53.68	0 10.7
18	9 38 0.07	10.496	13 55 29.2	80.62	1 53.7	18	9 50 10.64	7.846	8 15 12.0	60.26	0 3.6
19	9 42 6.09	10.005	13 23 23.2	79.84	1 53.9	19	9 47 3.88	7.691	8 40 3.9	63.90	23 49.7
20	9 46 0.23	9.505	12 51 38.7	78.84	1 53.8	20	9 44 2.75	7.575	9 6 10.7	66.49	23 42.9
21	9 49 42.28	+ 8.997	+12 20 20.9	-77.61	1 53.6	21	9 41 11.16	-6.896	+ 9 33 6.7	+67.99	23 36.3
22	9 53 12.01	8.478	11 49 35.5	76.14	1 53.1	22	9 38 32.98	6.261	10 0 25.1	68.55	23 30.0
23	9 56 29.14	7.947	11 19 28.1	74.44	1 52.4	23	9 36 11.83	5.477	10 27 38.5	67.58	23 24.1
24	9 59 33.35	7.402	10 50 4.5	72.49	1 51.5	24	9 34 11.19	4.555	10 54 19.9	65.69	23 18.6
25	10 2 24.29	6.841	10 21 30.8	70.28	1 50.4	25	9 32 34.13	3.514	11 20 3.1	62.74	23 13.5
26	10 5 1.56	+ 6.265	+ 9 53 53.5	-67.79	1 49.0	26	9 31 23.36	-2.369	+11 44 23.6	+58.80	23 8.8
27	10 7 24.76	5.667	9 27 19.3	65.02	1 47.5	27	9 30 41.08	-1.141	12 6 58.6	53.96	23 4.7
28	10 9 33.42	5.051	9 1 54.9	61.96	1 45.7	28	9 30 29.09	+0.151	12 27 27.4	48.30	23 1.1
29	10 11 27.05	4.414	8 37 47.7	58.59	1 43.6	29	9 30 48.65	1.485	12 45 31.5	41.92	22 57.9
30	10 13 5.12	3.755	8 15 5.3	54.89	1 41.3	30	9 31 40.55	2.842	13 0 54.8	34.92	22 55.4
31	10 14 27.12	+ 3.075	+ 7 53 55.6	-50.86	1 38.7	31	9 33 5.10	+4.203	+13 13 23.3	+27.38	22 53.4
32	10 15 32.52	+ 2.372	+ 7 34 26.7	-46.48	1 35.9	32	9 35 2.17	+5.550	+13 22 45.2	+19.39	22 51.9
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter . . . 3.0 3.2 3.5 3.8 4.1 4.5						Semidiameter . . . 4.9 5.2 5.5 5.4 5.0 4.4					
Hor. Parallax . . . 7.9 8.5 9.2 9.9 10.8 11.8						Hor. Parallax . . . 12.9 13.9 14.5 14.3 13.3 11.7					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	9 35 2.17	+ 5.550	+13 22 45.2	+ 19.39	22 51.9	1	12 32 30.61	+15.851	- 2 9 8.2	-116.46	23 54.9
2	9 37 31.24	6.867	13 28 50.9	11.04	22 51.0	2	12 38 49.66	15.736	2 55 35.4	115.78	23 57.2
3	9 40 31.40	8.137	13 31 32.7	+ 2.42	22 50.5	3	12 45 6.01	15.627	3 41 44.9	114.98	23 59.5
4	9 44 1.33	9.347	13 30 45.4	- 6.38	22 50.5	4	12 51 19.82	15.524	4 27 33.8	114.07	
5	9 47 59.47	10.486	13 26 25.6	15.27	22 50.9	5	12 57 31.22	15.427	5 12 59.4	113.05	0 1.7
6	9 52 24.01	+11.544	+13 18 32.3	- 24.16	22 51.8	6	13 3 40.38	+15.337	- 5 57 59.3	-111.93	0 3.9
7	9 57 12.89	12.513	13 7 6.7	32.95	22 53.0	7	13 9 47.45	15.254	6 42 31.3	110.72	0 6.1
8	10 2 23.88	13.386	12 52 12.1	41.56	22 54.6	8	13 15 52.62	15.176	7 26 33.4	109.44	0 8.3
9	10 7 54.63	14.160	12 33 53.9	49.90	22 56.4	9	13 21 56.03	15.108	8 10 3.7	108.08	0 10.4
10	10 13 42.77	14.834	12 12 19.8	57.88	22 58.5	10	13 27 57.85	15.044	8 53 0.6	106.65	0 12.5
11	10 19 45.89	+15.409	+11 47 38.9	- 65.44	23 0.8	11	13 33 58.23	+14.988	- 9 35 22.2	-105.15	0 14.6
12	10 26 1.65	15.888	11 20 2.4	72.52	23 3.3	12	13 39 57.33	14.938	10 17 7.2	103.60	0 16.6
13	10 32 27.80	16.276	10 49 42.1	79.08	23 6.0	13	13 45 55.28	14.893	10 58 14.4	101.98	0 18.6
14	10 39 2.25	16.580	10 16 51.1	85.08	23 8.7	14	13 51 52.23	14.854	11 38 42.1	100.32	0 20.6
15	10 45 43.05	16.808	9 41 43.0	90.50	23 11.5	15	13 57 48.33	14.822	12 18 29.2	98.60	0 22.6
16	10 52 28.47	+16.967	+ 9 4 31.8	- 95.34	23 14.4	16	14 3 43.70	+14.795	-12 57 34.4	- 96.83	0 24.6
17	10 59 16.97	17.066	8 25 31.1	99.62	23 17.3	17	14 9 38.43	14.770	13 35 56.5	95.01	0 26.6
18	11 6 7.21	17.113	7 44 54.3	103.36	23 20.2	18	14 15 32.67	14.750	14 13 34.3	93.13	0 28.6
19	11 12 58.06	17.117	7 2 54.2	106.56	23 23.1	19	14 21 26.47	14.735	14 50 26.5	91.21	0 30.5
20	11 19 48.55	17.085	6 19 43.1	109.28	23 26.0	20	14 27 19.96	14.723	15 26 32.0	89.24	0 32.4
21	11 26 37.91	+17.025	+ 5 35 32.3	-111.54	23 28.8	21	14 33 13.19	+14.713	-16 1 49.6	- 87.22	0 34.4
22	11 33 25.56	16.943	4 50 32.5	113.38	23 31.7	22	14 39 6.21	14.706	16 36 17.9	85.14	0 36.3
23	11 40 11.03	16.844	4 4 53.2	114.84	23 34.5	23	14 44 59.07	14.700	17 9 55.9	83.02	0 38.3
24	11 46 53.94	16.730	3 18 43.2	115.94	23 37.2	24	14 50 51.82	14.696	17 42 42.2	80.83	0 40.2
25	11 53 34.00	16.608	2 32 10.5	116.74	23 39.9	25	14 56 44.46	14.691	18 14 35.3	78.59	0 42.2
26	12 0 11.10	+16.482	+ 1 45 22.2	-117.25	23 42.5	26	15 2 36.97	+14.685	-18 45 34.2	- 76.31	0 44.1
27	12 6 45.14	16.333	0 58 24.8	117.50	23 45.1	27	15 8 29.33	14.678	19 15 37.6	73.96	0 46.0
28	12 13 16.06	16.224	+ 0 11 24.2	117.52	23 47.6	28	15 14 21.48	14.668	19 44 43.8	71.55	0 48.0
29	12 19 43.91	16.097	- 0 35 34.3	117.34	23 50.1	29	15 20 13.35	14.654	20 12 51.3	69.07	0 49.9
30	12 26 8.73	15.972	1 22 26.5	116.98	23 52.5	30	15 26 4.82	14.635	20 39 58.8	66.54	0 51.8
31	12 32 30.61	+15.851	- 2 9 8.2	-116.46	23 54.9	31	15 31 55.76	+14.609	-21 6 4.7	- 63.94	0 53.7
32	12 38 49.66	+15.736	- 2 55 35.4	-115.78	23 57.2	32	15 37 45.98	+14.575	-21 31 7.5	- 61.28	0 55.6
Day of the Month.						Day of the Month.					
Semidiameter . . .						Semidiameter . . .					
Hor. Parallax . . .						Hor. Parallax . . .					
3.8						2.4					
10.1						6.3					
3.3						2.4					
2.9						2.4					
7.7						6.4					
2.7						2.4					
7.0						6.5					
2.5						2.5					
6.6						6.7					

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	15 37 45.98	+14.575	-21 31 7.5	-61.28	0 55.6	1	17 15 8.80	-9.800	-23 11 15.4	+59.38	0 34.4
2	15 43 35.27	14.531	21 55 5.4	58.54	0 57.5	2	17 10 53.42	11.440	22 46 33.4	64.02	0 26.3
3	15 49 23.37	14.475	22 17 56.9	55.74	0 59.4	3	17 6 2.01	12.786	22 20 9.4	67.82	0 17.5
4	15 55 9.98	14.406	22 39 40.1	52.86	1 1.2	4	17 0 42.72	13.750	21 52 28.0	70.38	0 8.8
5	16 0 54.72	14.320	23 0 13.4	49.90	1 3.0	5	16 55 5.57	14.265	21 24 3.8	71.35	23 49.2
6	16 6 37.17	+14.214	-23 19 34.8	-46.87	1 4.7	6	16 49 21.80	-14.297	-20 55 37.9	+70.47	23 39.7
7	16 12 16.83	14.087	23 37 42.5	43.76	1 6.4	7	16 43 43.12	13.846	20 27 57.3	67.57	23 30.4
8	16 17 53.14	13.934	23 54 34.7	40.58	1 8.1	8	16 38 20.68	12.952	20 1 50.2	62.69	23 21.6
9	16 23 25.44	13.752	24 10 9.5	37.31	1 9.7	9	16 33 24.40	11.681	19 38 1.8	56.08	23 13.3
10	16 28 52.97	13.536	24 24 24.9	33.96	1 11.3	10	16 29 2.29	10.122	19 17 9.7	48.05	23 5.7
11	16 34 14.87	+13.282	-24 37 18.9	-30.33	1 12.7	11	16 25 20.14	-8.367	-18 59 42.8	+59.09	22 58.8
12	16 39 30.15	12.984	24 48 49.5	27.01	1 14.0	12	16 22 21.57	6.504	18 45 57.5	29.63	22 52.6
13	16 44 37.69	12.655	24 58 54.7	23.41	1 15.1	13	16 20 8.22	4.611	18 36 1.4	20.08	22 47.1
14	16 49 36.20	12.231	25 7 32.4	19.72	1 16.2	14	16 18 40.02	2.749	18 29 51.3	10.83	22 42.4
15	16 54 24.25	11.762	25 14 40.5	15.96	1 17.1	15	16 17 55.67	-0.963	18 27 17.1	+2.14	22 38.4
16	16 59 0.18	+11.220	-25 20 17.1	-12.08	1 17.7	16	16 17 52.98	+0.718	-18 28 2.9	-5.82	22 35.1
17	17 3 22.16	10.597	25 24 19.7	8.12	1 18.1	17	16 18 29.20	2.276	18 31 49.5	12.92	22 32.3
18	17 7 28.11	9.882	25 26 46.1	-4.07	1 18.2	18	16 19 41.35	3.711	18 38 15.9	19.12	22 30.1
19	17 11 15.71	9.066	25 27 34.3	+0.08	1 18.0	19	16 21 26.30	5.013	18 47 0.2	24.42	22 28.4
20	17 14 42.38	8.138	25 26 41.7	4.33	1 17.5	20	16 23 40.97	6.190	18 57 41.3	28.86	22 27.1
21	17 17 45.36	+7.088	-25 24 5.5	+8.66	1 16.6	21	16 26 22.50	+7.232	-19 9 59.0	-32.48	22 26.2
22	17 20 21.55	5.905	25 19 43.0	13.19	1 15.3	22	16 29 28.18	8.205	19 23 34.4	35.35	22 25.7
23	17 22 27.68	4.582	25 13 31.1	17.83	1 13.4	23	16 32 55.53	9.059	19 38 10.2	37.53	22 25.5
24	17 24 0.36	3.116	25 5 26.2	22.61	1 11.0	24	16 36 42.30	9.825	19 53 30.8	39.09	22 25.6
25	17 24 56.13	+1.508	24 55 24.8	27.54	1 7.9	25	16 40 46.48	10.512	20 9 22.0	40.09	22 26.0
26	17 25 11.67	-0.235	-24 43 22.9	+32.64	1 4.2	26	16 45 6.31	+11.129	-20 25 31.1	-40.60	22 26.6
27	17 24 43.95	2.093	24 29 16.4	37.93	0 59.8	27	16 49 40.18	11.683	20 41 47.2	40.67	22 27.4
28	17 23 30.55	4.035	24 13 1.5	43.34	0 54.6	28	16 54 26.65	12.182	20 58 0.0	40.34	22 28.4
29	17 21 30.01	6.012	23 54 35.7	48.81	0 48.7	29	16 59 24.52	12.633	21 14 0.9	39.68	22 29.6
30	17 18 42.23	7.960	23 33 59.2	54.22	0 41.9	30	17 4 32.68	13.042	21 29 42.2	38.72	22 31.0
31	17 15 8.80	-9.800	-23 11 15.4	+59.38	0 34.4	31	17 9 50.17	+13.410	-21 44 57.0	-37.48	22 32.5
32	17 10 53.42	-11.440	-22 46 33.4	+64.02	0 26.3	32	17 15 16.11	+13.746	-21 59 39.2	-36.00	22 34.1

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter . . .	"	"	"	"	"	"	Semidiameter .	"	"	"	"	"	"	"
Hor. Parallax . . .	2.7	2.8	3.0	3.3	3.8	4.3	Hor. Parallax .	4.8	4.9	4.5	4.0	3.5	3.2	2.9
	7.0	7.5	8.1	8.9	10.0	11.4		12.7	13.0	12.0	10.5	9.3	8.4	7.7

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	16 11 18.70	+3.955	-16 35 28.5	-1.73	21 25.4	1	17 43 16.71	+9.878	-19 20 55.8	-12.90	20 57.4
2	16 12 57.28	4.258	16 36 29.6	3.36	21 23.3	2	17 47 15.10	9.986	19 25 57.4	12.22	20 57.5
3	16 14 43.03	4.552	16 38 8.8	4.89	21 21.2	3	17 51 16.03	10.090	19 30 42.3	11.50	20 57.6
4	16 16 35.71	4.836	16 40 23.5	6.32	21 19.3	4	17 55 19.39	10.190	19 35 9.4	10.74	20 57.7
5	16 18 35.09	5.110	16 43 11.3	7.65	21 17.5	5	17 59 25.09	10.286	19 39 17.8	9.94	20 57.9
6	16 20 40.93	+5.375	-16 46 29.8	-8.88	21 15.8	6	18 3 33.04	+10.377	-19 43 6.4	-9.10	20 58.1
7	16 22 53.02	5.651	16 50 16.8	10.02	21 14.1	7	18 7 43.15	10.465	19 46 34.5	8.23	20 58.4
8	16 25 11.16	5.878	16 54 29.9	11.06	21 12.5	8	18 11 55.31	10.549	19 49 41.1	7.32	20 58.7
9	16 27 35.12	6.116	16 59 6.8	12.00	21 11.1	9	18 16 9.45	10.629	19 52 25.5	6.38	20 59.0
10	16 30 4.70	6.346	17 4 5.3	12.86	21 9.7	10	18 20 25.46	10.705	19 54 46.9	5.40	20 59.3
11	16 32 39.69	+6.568	-17 9 23.2	-13.62	21 8.4	11	18 24 43.26	+10.778	-19 56 44.5	-4.40	20 59.7
12	16 35 19.90	6.782	17 14 58.4	14.30	21 7.2	12	18 29 2.78	10.848	19 58 17.7	3.37	21 0.1
13	16 38 5.16	6.988	17 20 48.8	14.90	21 6.1	13	18 33 23.93	10.914	19 59 25.8	2.31	21 0.5
14	16 40 55.30	7.188	17 26 52.6	15.41	21 5.1	14	18 37 46.62	10.977	20 0 8.2	1.23	21 0.9
15	16 43 50.15	7.381	17 33 7.7	15.84	21 4.1	15	18 42 10.78	11.036	20 0 24.2	-0.12	21 1.4
16	16 46 49.57	+7.568	-17 39 32.3	-16.20	21 3.2	16	18 46 36.34	+11.093	-20 0 13.5	+1.01	21 1.9
17	16 49 53.40	7.749	17 46 4.6	16.48	21 2.4	17	18 51 3.22	11.147	19 59 35.4	2.16	21 2.5
18	16 53 1.49	7.924	17 52 42.7	16.68	21 1.6	18	18 55 31.35	11.197	19 58 29.5	3.33	21 3.0
19	16 56 13.73	8.094	17 59 24.9	16.81	21 0.9	19	19 0 0.66	11.245	19 56 55.3	4.32	21 3.6
20	16 59 29.98	8.259	18 6 9.5	16.88	21 0.3	20	19 4 31.09	11.290	19 54 52.3	5.73	21 4.2
21	17 2 50.12	+8.418	-18 12 54.8	-16.88	20 59.8	21	19 9 2.56	+11.332	-19 52 20.1	+6.95	21 4.8
22	17 6 14.03	8.573	18 19 39.3	16.81	20 59.3	22	19 13 35.01	11.371	19 49 18.5	8.18	21 5.4
23	17 9 41.59	8.723	18 26 21.4	16.68	20 58.9	23	19 18 8.38	11.408	19 45 47.1	9.43	21 6.0
24	17 13 12.70	8.868	18 32 59.6	16.49	20 58.5	24	19 22 42.60	11.442	19 41 45.6	10.69	21 6.6
25	17 16 47.24	9.009	18 39 32.5	16.23	20 58.2	25	19 27 17.60	11.474	19 37 13.9	11.96	21 7.3
26	17 20 25.11	+9.146	-18 45 58.5	-15.92	20 58.0	26	19 31 53.32	+11.503	-19 32 11.5	+13.24	21 8.0
27	17 24 6.22	9.279	18 52 16.2	15.55	20 57.8	27	19 36 29.70	11.529	19 26 38.4	14.52	21 8.7
28	17 27 50.46	9.407	18 58 24.3	15.12	20 57.6	28	19 41 6.68	11.552	19 20 34.4	15.81	21 9.4
29	17 31 37.73	9.531	19 4 21.6	14.64	20 57.5	29	19 45 44.19	11.573	19 13 59.5	17.10	21 10.1
30	17 35 27.93	9.651	19 10 6.7	14.11	20 57.4	30	19 50 22.18	11.592	19 6 53.5	18.39	21 10.8
31	17 39 20.96	+9.766	-19 15 38.5	-13.53	20 57.4	31	19 55 0.58	+11.607	-18 59 16.4	+19.69	21 11.5
32	17 43 16.71	+9.878	-19 20 55.8	-12.90	20 57.4	32	19 59 39.33	+11.621	-18 51 8.2	+20.99	21 12.2
Day of the Month.						Day of the Month.					
1st.						5th.					
6th.						10th.					
11th.						15th.					
16th.						20th.					
21st.						25th.					
26th.											
27th.											
28th.											
29th.											
30th.											
31st.											
Semidiameter .						Semidiameter .					
Hor. Parallax .						Hor. Parallax .					
22.5 20.7 10.1 17.7 16.5 15.4 14.4						13.5 12.7 12.0 11.4 10.9					
23.3 21.5 19.8 18.4 17.1 15.9 14.9						14.0 13.2 12.5 11.8 11.3					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	19 45 44.19	+11.573	-19 13 59.5	+17.10	21 10.1	1	22 9 2.39	+11.339	-11 47 23.5	+52.72	21 31.0
2	19 50 22.18	11.591	19 6 53.5	18.39	21 10.8	2	22 13 34.29	11.319	11 26 7.8	53.59	21 31.6
3	19 55 0.58	11.607	18 59 16.4	19.69	21 11.5	3	22 18 5.71	11.299	11 4 31.6	54.43	21 32.2
4	19 59 39.33	11.621	18 51 8.2	20.99	21 12.2	4	22 22 36.66	11.280	10 42 35.4	55.25	21 32.8
5	20 4 18.37	11.632	18 42 29.0	22.28	21 12.9	5	22 27 7.15	11.260	10 20 19.8	56.04	21 33.4
6	20 8 57.65	+11.641	-18 33 18.8	+23.57	21 13.6	6	22 31 37.17	+11.241	- 9 57 45.5	+56.81	21 33.9
7	20 13 37.11	11.647	18 23 37.7	24.85	21 14.3	7	22 36 6.73	11.222	9 34 53.0	57.55	21 34.5
8	20 18 16.68	11.650	18 13 25.9	26.13	21 15.0	8	22 40 35.83	11.203	9 11 42.9	58.27	21 35.0
9	20 22 56.32	11.651	18 2 43.6	27.40	21 15.8	9	22 45 4.48	11.184	8 48 16.0	58.96	21 35.5
10	20 27 35.97	11.651	17 51 30.9	28.66	21 16.5	10	22 49 32.68	11.166	8 24 32.9	59.63	21 36.0
11	20 32 15.59	+11.649	-17 39 48.1	+29.91	21 17.2	11	22 54 0.45	+11.148	- 8 0 34.1	+60.27	21 36.5
12	20 36 55.12	11.645	17 27 35.3	31.15	21 17.9	12	22 58 27.80	11.131	7 36 20.3	60.88	21 37.0
13	20 41 34.53	11.639	17 14 52.9	32.38	21 18.7	13	23 2 54.75	11.115	7 11 52.1	61.47	21 37.5
14	20 46 13.78	11.631	17 1 41.2	33.60	21 19.4	14	23 7 21.32	11.099	6 47 10.1	62.03	21 38.0
15	20 50 52.83	11.622	16 48 0.4	34.80	21 20.1	15	23 11 47.53	11.084	6 22 14.9	62.56	21 38.5
16	20 55 31.64	+11.611	-16 33 50.9	+35.99	21 20.8	16	23 16 13.40	+11.070	- 5 57 7.3	+63.07	21 39.0
17	21 0 10.18	11.600	16 19 13.0	37.17	21 21.4	17	23 20 38.94	11.057	5 31 47.7	63.55	21 39.5
18	21 4 48.42	11.587	16 4 7.0	38.33	21 22.1	18	23 25 4.17	11.045	5 6 16.8	64.01	21 40.0
19	21 9 26.35	11.573	15 48 33.4	39.48	21 22.8	19	23 29 29.13	11.034	4 40 35.2	64.44	21 40.5
20	21 14 3.93	11.558	15 32 32.3	40.61	21 23.5	20	23 33 53.83	11.024	4 14 43.6	64.85	21 41.0
21	21 18 41.15	+11.543	-15 16 4.3	+41.72	21 24.1	21	23 38 18.31	+11.016	- 3 48 42.4	+65.23	21 41.5
22	21 23 17.98	11.526	14 59 9.7	42.81	21 24.8	22	23 42 42.61	11.009	3 22 32.4	65.59	21 42.0
23	21 27 54.41	11.509	14 41 49.1	43.89	21 25.4	23	23 47 6.74	11.003	2 56 14.1	65.92	21 42.5
24	21 32 30.41	11.491	14 24 2.7	44.95	21 26.1	24	23 51 30.74	10.998	2 29 48.3	66.23	21 42.9
25	21 37 5.98	11.473	14 5 51.1	46.00	21 26.7	25	23 55 54.63	10.994	2 3 15.5	66.51	21 43.3
26	21 41 41.12	+11.455	-13 47 14.7	+47.03	21 27.4	26	0 0 18.44	+10.991	- 1 36 36.3	+66.76	21 43.7
27	21 46 15.81	11.436	13 28 14.0	48.03	21 28.0	27	0 4 42.20	10.990	1 9 51.4	66.98	21 44.2
28	21 50 50.05	11.417	13 8 49.5	49.01	21 28.6	28	0 9 5.95	10.990	0 43 1.4	67.18	21 44.6
29	21 55 23.84	11.398	12 49 1.7	49.97	21 29.2	29	0 13 29.71	10.991	- 0 16 7.0	67.35	21 45.1
30	21 59 57.16	11.379	12 28 51.0	50.91	21 29.8	30	0 17 53.52	10.994	+ 0 10 51.2	67.49	21 45.5
31	22 4 30.01	+11.359	-12 8 18.1	+51.83	21 30.4	31	0 22 17.41	+10.998	+ 0 37 52.4	+67.61	21 46.0
32	22 9 2.39	+11.339	-11 47 23.5	+52.72	21 31.0	32	0 26 41.41	+11.003	+ 1 4 56.1	+67.70	21 46.4

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . . .	10.4	9.9	9.5	9.1	8.7	8.4	Semidiameter . . .	8.2	7.9	7.6	7.4	7.2	7.0
Hor. Parallax . . .	10.7	10.3	9.8	9.4	9.1	8.7	Hor. Parallax . . .	8.4	8.2	7.9	7.7	7.5	7.3

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.											
MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	0 22 17.41	+10.998	+ 0 37 52.4	+67.61	21 46.0	1	2 42 3.13	+11.747	+14 0 6.1	+37.87	22 3.8
2	0 26 41.41	11.003	1 4 56.1	67.70	21 46.4	2	2 46 45.58	11.790	14 22 51.0	56.47	22 4.5
3	0 31 5.55	11.009	1 32 1.6	67.76	21 46.9	3	2 51 29.06	11.833	14 45 16.5	55.65	22 5.3
4	0 35 29.86	11.017	1 59 8.2	67.79	21 47.4	4	2 56 13.58	11.877	15 7 21.9	54.80	22 6.1
5	0 39 54.37	11.026	2 26 15.3	67.79	21 47.9	5	3 0 59.15	11.921	15 29 6.6	53.92	22 6.9
6	0 44 19.10	+11.036	+ 2 53 22.1	+67.77	21 48.3	6	3 5 45.79	+11.966	+15 50 29.7	+53.01	22 7.7
7	0 48 44.10	11.047	3 20 28.0	67.72	21 48.8	7	3 10 33.52	12.011	16 11 30.6	52.07	22 8.6
8	0 53 9.39	11.060	3 47 32.4	67.64	21 49.2	8	3 15 22.33	12.056	16 32 8.6	51.10	22 9.5
9	0 57 34.99	11.074	4 14 34.4	67.53	21 49.7	9	3 20 12.24	12.102	16 52 23.0	50.10	22 10.4
10	1 2 0.93	11.089	4 41 33.5	67.39	21 50.2	10	3 25 3.24	12.148	17 12 13.0	49.07	22 11.3
11	1 6 27.26	+11.105	+ 5 8 28.9	+67.22	21 50.7	11	3 29 55.34	+12.194	+17 31 38.0	+48.01	22 12.3
12	1 10 54.00	11.123	5 35 20.1	67.03	21 51.2	12	3 34 48.55	12.240	17 50 37.4	46.98	22 13.3
13	1 15 21.17	11.142	6 2 6.2	66.81	21 51.7	13	3 39 42.86	12.286	18 9 10.4	45.81	22 14.3
14	1 19 48.82	11.162	6 28 46.7	66.56	21 52.2	14	3 44 38.27	12.332	18 27 16.4	44.67	22 15.3
15	1 24 16.97	11.184	6 55 20.8	66.28	21 52.7	15	3 49 34.79	12.378	18 44 54.8	43.51	22 16.3
16	1 28 45.66	+11.207	+ 7 21 48.0	+65.98	21 53.3	16	3 54 32.41	+12.424	+19 2 4.8	+42.32	22 17.3
17	1 33 14.91	11.231	7 48 7.6	65.64	21 53.8	17	3 59 31.12	12.469	19 18 45.8	41.10	22 18.4
18	1 37 44.76	11.257	8 14 18.8	65.28	21 54.4	18	4 4 30.92	12.514	19 34 57.2	39.85	22 19.5
19	1 42 15.24	11.284	8 40 21.1	64.89	21 55.0	19	4 9 31.79	12.559	19 50 38.4	38.58	22 20.6
20	1 46 46.40	11.312	9 6 13.8	64.48	21 55.6	20	4 14 33.74	12.603	20 5 48.7	37.28	22 21.7
21	1 51 18.25	+11.344	+ 9 31 56.2	+64.04	21 56.2	21	4 19 36.75	+12.647	+20 20 27.7	+35.96	22 22.8
22	1 55 50.82	11.373	9 57 27.5	63.57	21 56.8	22	4 24 40.80	12.690	20 34 34.5	34.61	22 23.9
23	2 0 24.16	11.405	10 22 47.2	63.07	21 57.4	23	4 29 45.87	12.732	20 48 8.6	33.24	22 25.1
24	2 4 58.29	11.439	10 47 54.6	62.54	21 58.1	24	4 34 51.94	12.773	21 1 9.5	31.84	22 26.3
25	2 9 33.24	11.474	11 12 49.0	61.98	21 58.7	25	4 39 58.99	12.814	21 13 36.7	30.42	22 27.5
26	2 14 9.04	+11.510	+11 37 29.5	+61.39	21 59.4	26	4 45 7.01	+12.854	+21 25 29.5	+28.98	22 28.7
27	2 18 45.71	11.547	12 1 55.7	60.77	22 0.1	27	4 50 15.96	12.892	21 36 47.5	27.51	22 29.9
28	2 23 23.29	11.585	12 26 6.8	60.13	22 0.8	28	4 55 25.83	12.929	21 47 30.0	26.02	22 31.1
29	2 28 1.80	11.624	12 50 2.1	59.46	22 1.5	29	5 0 36.57	12.965	21 57 36.7	24.52	22 32.4
30	2 32 41.26	11.664	13 13 40.9	58.76	22 2.3	30	5 5 48.15	12.999	22 7 7.0	22.99	22 33.6
31	2 37 21.70	+11.705	+13 37 2.5	+58.03	22 3.0	31	5 11 0.52	+13.032	+22 16 0.4	+21.45	22 34.9
32	2 42 3.13	+11.747	+14 0 6.1	+57.27	22 3.8	32	5 16 13.66	+13.063	+22 24 16.6	+19.89	22 36.2
Day of the Month.	1st.	5th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.			
								5th.	10th.	15th.	20th.
Semidiameter .	6.8	6.6	6.5	6.4	6.2	6.1	6.0				
Hor. Parallax .	7.1	6.9	6.7	6.6	6.4	6.3	6.2				
								Semidiameter .	5.9	5.8	5.7
								Hor. Parallax .	6.1	6.0	5.9

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	5 11 0.52	+13.032	+22 16 0.4	+21.45	22 34.9	1	7 54 36.80	+13.021	+21 25 18.5	-29.69	23 16.4
2	5 16 13.66	13.063	22 24 16.6	19.89	22 36.2	2	7 59 48.92	12.989	21 13 7.2	31.25	23 17.6
3	5 21 27.50	13.092	22 31 55.1	18.32	22 37.5	3	8 5 0.26	12.956	21 0 18.8	32.79	23 18.8
4	5 26 42.03	13.119	22 38 55.6	16.73	22 38.8	4	8 10 10.79	12.922	20 46 53.8	34.30	23 20.0
5	5 31 57.19	13.144	22 45 17.7	15.12	22 40.1	5	8 15 20.48	12.886	20 32 52.6	35.79	23 21.2
6	5 37 12.93	+13.167	+22 51 1.0	+13.500	22 41.4	6	8 20 29.30	+12.849	+20 18 15.7	-37.27	23 22.4
7	5 42 29.21	13.189	22 56 5.3	11.86	22 42.8	7	8 25 37.21	12.810	20 3 3.7	38.73	23 23.6
8	5 47 45.97	13.208	23 0 30.1	10.21	22 44.1	8	8 30 44.20	12.771	19 47 17.1	40.16	23 24.7
9	5 53 3.16	13.225	23 4 15.3	8.55	22 45.5	9	8 35 50.24	12.731	19 30 56.3	41.57	23 25.9
10	5 58 20.73	13.240	23 7 20.6	6.89	22 46.8	10	8 40 55.30	12.690	19 14 2.0	42.95	23 27.0
11	6 3 38.62	+13.252	+23 9 45.9	+ 3.22	22 48.2	11	8 45 59.37	+12.649	+18 56 34.7	-44.31	23 28.1
12	6 8 56.79	13.262	23 11 30.9	3.54	22 49.5	12	8 51 2.44	12.607	18 38 35.1	45.68	23 29.2
13	6 14 15.17	13.270	23 12 35.6	1.85	22 50.9	13	8 56 4.49	12.565	18 20 3.6	46.96	23 30.2
14	6 19 33.72	13.276	23 12 59.8	+ 0.16	22 52.3	14	9 1 5.52	12.522	18 1 1.0	48.25	23 31.3
15	6 24 52.37	13.279	23 12 43.3	- 1.53	22 53.7	15	9 6 5.52	12.479	17 41 27.7	49.51	23 32.3
16	6 30 11.08	+13.280	+23 11 46.2	- 3.22	22 55.0	16	9 11 4.48	+12.435	+17 21 24.6	-50.74	23 33.4
17	6 35 29.79	13.279	23 10 8.5	4.92	22 56.4	17	9 16 2.39	12.392	17 0 52.2	51.95	23 34.4
18	6 40 48.46	13.276	23 7 50.0	6.61	22 57.8	18	9 20 59.26	12.348	16 39 51.1	53.13	23 35.4
19	6 46 7.03	13.271	23 4 50.8	8.31	22 59.2	19	9 25 55.10	12.305	16 18 22.0	54.28	23 36.4
20	6 51 25.44	13.264	23 1 11.0	10.00	23 0.5	20	9 30 49.91	12.262	15 56 25.6	55.41	23 37.3
21	6 56 43.65	+13.254	+22 56 50.7	-11.69	23 1.9	21	9 35 43.70	+12.220	+15 34 2.5	-56.51	23 38.3
22	7 2 1.60	13.242	22 51 49.9	13.37	23 3.2	22	9 40 36.48	12.178	15 11 13.3	57.58	23 39.2
23	7 7 19.25	13.228	22 46 8.8	15.05	23 4.6	23	9 45 28.25	12.137	14 47 58.7	58.62	23 40.1
24	7 12 36.55	13.212	22 39 47.4	16.72	23 5.9	24	9 50 19.03	12.096	14 24 19.5	59.64	23 41.0
25	7 17 53.45	13.195	22 32 46.0	18.38	23 7.3	25	9 55 8.84	12.056	14 0 16.3	60.63	23 41.9
26	7 23 9.91	+13.175	+22 25 4.8	-20.04	23 8.6	26	9 59 57.70	+12.016	+13 35 49.8	-61.58	23 42.7
27	7 28 25.87	13.154	22 16 44.2	21.68	23 9.9	27	10 4 45.61	11.977	13 11 0.6	62.50	23 43.6
28	7 33 41.30	13.131	22 7 44.3	23.31	23 11.2	28	10 9 32.60	11.939	12 45 49.6	63.40	23 44.4
29	7 38 56.15	13.106	21 58 5.5	24.93	23 12.5	29	10 14 18.68	11.902	12 20 17.5	64.27	23 45.2
30	7 44 10.37	13.079	21 47 48.0	26.53	23 13.8	30	10 19 3.88	11.865	11 54 24.9	65.11	23 46.0
31	7 49 23.94	+13.051	+21 36 52.3	-28.12	23 15.1	31	10 23 48.22	+11.829	+11 28 12.6	-65.92	23 46.8
32	7 54 36.80	+13.021	+21 25 18.5	-29.69	23 16.4	32	10 28 31.73	+11.795	+11 1 41.2	-66.69	23 47.6

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . . .	5.4	5.3	5.2	5.2	5.1	5.1	Semidiameter . . .	5.1	5.1	5.0	5.0	5.0	5.0
Hor. Parallax . . .	5.6	5.5	5.4	5.4	5.3	5.3	Hor. Parallax . . .	5.3	5.2	5.2	5.2	5.2	5.2

The sign + prefixed to the hourly change of declination indicates that north-declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	10 28 31.73	+11.795	+11 1 41.2	-66.69	23 47.6	1	12 46 26.75	+11.433	- 3 40 30.9	-75.79	0 6.4
2	10 33 14.43	11.762	10 34 51.6	67.43	23 48.4	2	12 51 1.32	11.447	4 10 47.7	75.62	0 7.1
3	10 37 56.35	11.730	10 7 44.6	68.15	23 49.1	3	12 55 36.25	11.463	4 40 59.9	75.41	0 7.7
4	10 42 37.50	11.699	9 40 20.7	68.84	23 49.8	4	13 0 11.58	11.481	5 11 6.9	75.17	0 8.4
5	10 47 17.92	11.669	9 12 40.8	69.49	23 50.5	5	13 4 47.35	11.500	5 41 7.8	74.90	0 9.0
6	10 51 57.64	+11.640	+ 8 44 45.6	-70.11	23 51.2	6	13 9 23.60	+11.521	- 6 11 1.8	-74.60	0 9.7
7	10 56 36.69	11.613	8 16 35.8	70.70	23 51.9	7	13 14 0.36	11.543	6 40 48.3	74.27	0 10.3
8	11 1 15.10	11.587	7 48 12.2	71.26	23 52.6	8	13 18 37.69	11.567	7 10 26.3	73.90	0 11.0
9	11 5 52.89	11.562	7 19 35.5	71.79	23 53.3	9	13 23 15.61	11.593	7 39 55.1	73.50	0 11.7
10	11 10 30.11	11.539	6 50 46.4	72.29	23 54.0	10	13 27 54.16	11.620	8 9 14.0	73.07	0 12.4
11	11 15 6.78	+11.517	+ 6 21 45.8	-72.76	23 54.6	11	13 32 33.39	+11.649	- 8 38 22.3	-72.61	0 13.1
12	11 19 42.94	11.497	5 52 34.2	73.19	23 55.3	12	13 37 13.32	11.679	9 7 19.1	72.12	0 13.9
13	11 24 18.64	11.478	5 23 12.5	73.60	23 55.9	13	13 41 53.99	11.711	9 36 3.6	71.59	0 14.6
14	11 28 53.90	11.461	4 53 41.4	73.98	23 56.6	14	13 46 35.44	11.744	10 4 35.0	71.03	0 15.4
15	11 33 28.77	11.445	4 24 1.6	74.33	23 57.2	15	13 51 17.71	11.779	10 32 52.5	70.43	0 16.1
16	11 38 3.27	+11.431	+ 3 54 13.7	-74.65	23 57.8	16	13 56 0.83	+11.815	-11 0 55.5	-69.81	0 16.9
17	11 42 37.45	11.418	3 24 18.6	74.94	23 58.4	17	14 0 44.84	11.852	11 28 43.1	69.15	0 17.7
18	11 47 11.36	11.408	2 54 16.9	75.19	23 59.1	18	14 5 29.76	11.891	11 56 14.6	68.46	0 18.5
19	11 51 45.05	11.399	2 24 9.4	75.42	23 59.7	19	14 10 15.64	11.932	12 23 29.2	67.74	0 19.3
20	11 56 18.54	11.392	1 53 56.8	75.61		20	14 15 2.51	11.974	12 50 26.0	66.99	0 20.2
21	12 0 51.88	+11.387	+ 1 23 39.9	-75.78	0 0.3	21	14 19 50.39	+12.017	-13 17 4.3	-66.20	0 21.0
22	12 5 25.12	11.384	0 53 19.2	75.92	0 0.9	22	14 24 39.32	12.061	13 43 23.2	65.38	0 21.9
23	12 9 58.30	11.382	+ 0 22 55.5	76.04	0 1.5	23	14 29 29.32	12.106	14 9 22.0	64.52	0 22.8
24	12 14 31.47	11.382	- 0 7 30.5	76.12	0 2.1	24	14 34 20.43	12.152	14 34 59.9	63.63	0 23.7
25	12 19 4.66	11.384	0 37 57.8	76.16	0 2.7	25	14 39 12.66	12.200	15 0 16.1	62.71	0 24.6
26	12 23 37.92	+11.388	- 1 8 25.7	-76.17	0 3.3	26	14 44 6.05	+12.249	-15 25 9.7	-61.76	0 25.6
27	12 28 11.29	11.394	1 38 53.7	76.16	0 3.9	27	14 49 0.61	12.298	15 49 40.1	60.77	0 26.6
28	12 32 44.82	11.401	2 9 21.0	76.12	0 4.5	28	14 53 56.37	12.348	16 13 46.3	59.75	0 27.6
29	12 37 18.54	11.410	2 39 46.8	76.04	0 5.1	29	14 58 53.33	12.399	16 37 27.5	58.69	0 28.6
30	12 41 52.51	11.421	3 10 10.4	75.93	0 5.8	30	15 3 51.51	12.450	17 0 43.0	57.60	0 29.6
31	12 46 26.75	+11.433	- 3 40 30.9	-75.79	0 6.4	31	15 8 50.91	+12.501	-17 23 32.0	-56.48	0 30.6
32	12 51 1.32	+11.447	- 4 10 47.7	-75.62	0 7.1	32	15 13 51.56	+12.553	-17 45 53.6	-55.32	0 31.7
Day of the Month.						Day of the Month.					
	8d.	8th.	18th.	18th.	28d.		8d.	8th.	18th.	18th.	28d.
Semidiameter . . .	5.0	5.0	5.0	5.0	5.0	Semidiameter . . .	5.0	5.0	5.0	5.0	5.1
Hor. Parallax . . .	5.1	5.1	5.1	5.1	5.1	Hor. Parallax . . .	5.2	5.2	5.2	5.2	5.3

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1	15 13 51.56	+12.553	-17 45 53.6	-55.32	0 31.7	1	17 52 42.99	+13.715	-24 25 33.1	-7.70	1 12.3			
2	15 18 53.44	12.605	18 7 47.0	54.13	0 32.8	2	17 58 12.27	13.724	24 28 15.4	5.82	1 13.8			
3	15 23 56.58	12.657	18 29 11.4	52.91	0 33.9	3	18 3 41.73	13.730	24 30 12.7	3.94	1 15.4			
4	15 29 0.97	12.709	18 50 6.2	51.65	0 35.0	4	18 9 11.30	13.733	24 31 24.8	2.05	1 16.9			
5	15 34 6.59	12.761	19 10 30.5	50.36	0 36.2	5	18 14 40.91	13.733	24 31 51.6	-0.17	1 18.5			
6	15 39 13.46	+12.812	-19 30 23.5	-49.04	0 37.4	6	18 20 10.48	+13.730	-24 31 33.1	+1.72	1 20.0			
7	15 44 21.56	12.863	19 49 44.5	47.69	0 38.6	7	18 25 39.95	13.724	24 30 29.3	3.60	1 21.6			
8	15 49 30.88	12.914	20 8 32.7	46.31	0 39.8	8	18 31 9.24	13.715	24 28 40.1	5.49	1 23.1			
9	15 54 41.41	12.964	20 26 47.3	44.90	0 41.0	9	18 36 38.29	13.704	24 26 5.8	7.37	1 24.7			
10	15 59 53.13	13.013	20 44 27.7	43.46	0 42.2	10	18 42 7.03	13.690	24 22 46.5	9.24	1 26.2			
11	16 5 6.03	+13.061	-21 1 33.2	-41.99	0 43.5	11	18 47 35.38	+13.673	-24 18 42.3	+11.11	1 27.8			
12	16 10 20.08	13.109	21 18 3.0	40.49	0 44.8	12	18 53 3.29	13.653	24 13 53.3	12.97	1 29.3			
13	16 15 35.27	13.156	21 33 56.4	38.96	0 46.1	13	18 58 30.68	13.630	24 8 19.7	14.82	1 30.8			
14	16 20 51.57	13.202	21 49 13.1	37.41	0 47.4	14	19 3 57.50	13.605	24 2 1.8	16.66	1 32.3			
15	16 26 8.95	13.247	22 3 52.0	35.83	0 48.8	15	19 9 23.69	13.577	23 55 0.0	18.49	1 33.8			
16	16 31 27.39	+13.290	-22 17 52.6	-34.22	0 50.1	16	19 14 49.19	+13.547	-23 47 14.5	+20.30	1 35.3			
17	16 36 46.85	13.332	22 31 14.4	32.59	0 51.5	17	19 20 13.93	13.515	23 38 45.5	22.10	1 36.7			
18	16 42 7.30	13.372	22 43 56.7	30.93	0 52.9	18	19 25 37.87	13.481	23 29 33.4	23.89	1 38.2			
19	16 47 28.71	13.411	22 55 59.0	29.25	0 54.3	19	19 31 0.96	13.444	23 19 38.6	25.66	1 39.6			
20	16 52 51.03	13.448	23 7 20.8	27.55	0 55.7	20	19 36 23.14	13.405	23 9 1.5	27.42	1 41.0			
21	16 58 14.22	+13.483	-23 18 1.5	-25.83	0 57.2	21	19 41 44.37	+13.364	-22 57 42.7	+29.15	1 42.4			
22	17 3 38.23	13.517	23 28 0.5	24.09	0 58.6	22	19 47 4.60	13.322	22 45 42.6	30.86	1 43.8			
23	17 9 3.03	13.549	23 37 17.5	22.33	1 0.1	23	19 52 23.79	13.278	22 33 1.7	32.55	1 45.2			
24	17 14 28.55	13.578	23 45 52.1	20.55	1 1.6	24	19 57 41.91	13.232	22 19 40.6	34.21	1 46.6			
25	17 19 54.76	13.605	23 53 43.7	18.75	1 3.1	25	20 2 58.91	13.185	22 5 39.7	35.85	1 47.9			
26	17 25 21.59	+13.630	-24 0 52.1	-16.94	1 4.6	26	20 8 14.75	+13.136	-21 50 59.6	+37.47	1 49.2			
27	17 30 48.99	13.652	24 7 16.8	15.12	1 6.1	27	20 13 29.41	13.086	21 35 40.9	39.07	1 50.5			
28	17 36 16.89	13.672	24 12 57.6	13.28	1 7.6	28	20 18 42.85	13.034	21 19 44.3	40.64	1 51.8			
29	17 41 45.23	13.689	24 17 54.0	11.43	1 9.2	29	20 23 55.05	12.981	21 3 10.3	42.18	1 53.1			
30	17 47 13.95	13.703	24 22 5.9	9.57	1 10.7	30	20 29 5.97	12.928	20 45 59.7	43.69	1 54.4			
31	17 52 42.99	+13.715	-24 25 33.1	-7.70	1 12.3	31	20 34 15.61	+12.874	-20 28 13.2	+45.17	1 55.6			
32	17 58 12.27	+13.724	-24 28 15.4	-5.82	1 13.8	32	20 39 23.93	+12.819	-20 9 51.5	+46.63	1 56.8			
Day of the Month.						Day of the Month.								
	2d.	7th.	12th.	17th.	22d.	27th.		2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter . . .	5.1	5.2	5.2	5.3	5.3	5.4	Semidiameter .	5.4	5.5	5.5	5.6	5.7	5.8	5.8
Hor. Parallax . . .	5.3	5.4	5.4	5.4	5.5	5.6	Hor. Parallax .	5.6	5.7	5.7	5.8	5.9	6.0	6.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.



## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.											
JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	8 34 15.94	-3.055	+22 47 44.9	+16.55	13 47.6	1	7 45 34.05	-3.542	+25 38 39.4	+6.67	10 57.2
2	8 33 1.14	3.177	22 54 24.5	16.73	13 42.4	2	7 44 10.26	3.438	25 41 12.6	6.10	10 51.9
3	8 31 43.46	3.295	23 1 7.9	16.87	13 37.2	3	7 42 49.04	3.329	25 43 32.0	5.53	10 46.6
4	8 30 23.00	3.408	23 7 54.2	16.97	13 31.9	4	7 41 30.51	3.215	25 45 37.9	4.97	10 41.4
5	8 28 59.87	3.516	23 14 42.6	17.03	13 26.6	5	7 40 14.78	3.096	25 47 30.3	4.41	10 36.2
6	8 27 34.22	-3.618	+23 21 32.1	+17.06	13 21.2	6	7 39 1.95	-2.971	+25 49 9.4	+3.86	10 31.1
7	8 26 6.19	3.715	23 28 21.7	17.05	13 15.8	7	7 37 52.15	2.843	25 50 35.5	3.32	10 26.1
8	8 24 35.91	3.805	23 35 10.5	17.00	13 10.3	8	7 36 45.46	2.712	25 51 48.8	2.79	10 21.1
9	8 23 3.55	3.888	23 41 57.5	16.91	13 4.8	9	7 35 41.97	2.578	25 52 49.6	2.27	10 16.1
10	8 21 29.26	3.964	23 48 41.8	16.77	12 59.3	10	7 34 41.75	2.440	25 53 38.2	1.77	10 11.2
11	8 19 53.24	-4.033	+23 55 22.3	+16.59	12 53.8	11	7 33 44.87	-2.299	+25 54 14.8	+1.28	10 6.4
12	8 18 15.67	4.094	24 1 58.0	16.37	12 48.2	12	7 32 51.38	2.157	25 54 39.8	0.80	10 1.6
13	8 16 36.75	4.146	24 8 28.0	16.12	12 42.6	13	7 32 1.32	2.014	25 54 53.5	+0.33	9 56.9
14	8 14 56.70	4.189	24 14 51.4	15.83	12 37.0	14	7 31 14.72	1.870	25 54 56.2	-0.12	9 52.2
15	8 13 15.71	4.224	24 21 7.3	15.50	12 31.4	15	7 30 31.61	1.724	25 54 48.4	0.55	9 47.5
16	8 11 33.97	-4.250	+24 27 14.9	+15.13	12 25.8	16	7 29 51.99	-1.577	+25 54 30.3	-0.96	9 42.9
17	8 9 51.71	4.267	24 33 13.4	14.73	12 20.2	17	7 29 15.90	1.430	25 54 2.3	1.36	9 38.4
18	8 8 9.15	4.275	24 39 2.0	14.30	12 14.6	18	7 28 43.32	1.284	25 53 24.7	1.75	9 34.0
19	8 6 26.50	4.275	24 44 40.0	13.85	12 9.0	19	7 28 14.26	1.139	25 52 37.9	2.13	9 29.6
20	8 4 43.95	4.266	24 50 6.9	13.38	12 3.3	20	7 27 48.67	0.995	25 51 42.2	2.50	9 25.3
21	8 3 1.73	-4.248	+24 55 22.1	+12.88	11 57.7	21	7 27 26.54	-0.851	+25 50 37.9	-2.85	9 21.0
22	8 1 20.04	4.222	25 0 25.1	12.36	11 52.1	22	7 27 7.84	0.708	25 49 25.2	3.19	9 16.8
23	7 59 39.09	4.188	25 5 15.4	11.83	11 46.5	23	7 26 52.57	0.566	25 48 4.7	3.52	9 12.7
24	7 57 59.09	4.146	25 9 52.8	11.28	11 40.9	24	7 26 40.68	0.426	25 46 36.4	3.84	9 8.6
25	7 56 20.20	4.096	25 14 16.9	10.72	11 35.3	25	7 26 32.12	0.288	25 45 0.6	4.15	9 4.5
26	7 54 42.61	-4.037	+25 18 27.4	+10.13	11 29.8	26	7 26 26.84	-0.152	+25 43 17.5	-4.44	9 0.5
27	7 53 6.50	3.970	25 22 24.2	9.56	11 24.3	27	7 26 24.82	-0.018	25 41 27.4	4.72	8 56.5
28	7 51 32.05	3.897	25 26 7.1	8.97	11 18.8	28	7 26 26.01	+0.115	25 39 30.5	5.00	8 52.6
29	7 49 59.42	3.818	25 29 36.1	8.39	11 13.3	29	7 26 30.37	0.246	25 37 27.0	5.27	8 48.8
30	7 48 28.78	3.733	25 32 51.2	7.81	11 7.9	30	7 26 37.86	0.375	25 35 17.1	5.54	8 45.0
31	7 47 0.27	-3.641	+25 35 52.3	+7.24	11 2.5	31	7 26 48.43	+0.503	+25 33 0.8	-5.81	8 41.3
32	7 45 34.05	-3.542	+25 38 39.4	+6.67	10 57.2	32	7 27 2.02	+0.629	+25 30 38.3	-6.07	8 37.6
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th.					
Semidiameter . 7.5 7.6 7.7 7.7 7.7 7.6 7.5						Semidiameter . . 7.3 7.0 6.8 6.5 6.2					
Hor. Parallax . 13.1 13.4 13.6 13.6 13.5 13.3 13.1						Hor. Parallax . . 12.7 12.3 11.8 11.3 10.8					
NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.											

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 26 30.37	+0.246	+25 37 27.0	- 5.27	8 48.8	1	7 50 27.12	+3.263	+23 46 14.6	-12.49	7 11.1
2	7 26 37.86	0.375	25 35 17.1	5.54	8 45.0	2	7 51 46.20	3.327	23 41 12.1	12.72	7 8.5
3	7 26 48.43	0.503	25 33 0.8	5.81	8 41.3	3	7 53 6.80	3.389	23 36 4.0	12.96	7 5.9
4	7 27 2.02	0.629	25 30 38.3	6.07	8 37.6	4	7 54 28.89	3.450	23 30 50.1	13.20	7 3.4
5	7 27 18.60	0.752	25 28 9.7	6.32	8 34.0	5	7 55 52.42	3.510	23 25 30.5	13.44	7 0.8
6	7 27 38.12	+0.873	+25 25 35.1	- 6.57	8 30.4	6	7 57 17.36	+3.568	+23 20 5.1	-13.68	6 58.3
7	7 28 0.53	0.992	25 22 54.7	6.81	8 26.8	7	7 58 43.69	3.623	23 14 33.8	13.93	6 55.8
8	7 28 25.78	1.110	25 20 8.4	7.05	8 23.3	8	8 0 11.36	3.680	23 8 56.6	14.18	6 53.4
9	7 28 53.83	1.227	25 17 16.4	7.29	8 19.8	9	8 1 40.34	3.734	23 3 13.4	14.43	6 50.9
10	7 29 24.63	1.341	25 14 18.7	7.53	8 16.4	10	8 3 10.59	3.786	22 57 24.3	14.68	6 48.5
11	7 29 58.13	+1.452	+25 11 15.4	- 7.76	8 13.1	11	8 4 42.09	+3.837	+22 51 29.1	-14.93	6 46.1
12	7 30 34.27	1.561	25 8 6.4	7.99	8 9.8	12	8 6 14.79	3.887	22 45 27.8	15.18	6 43.8
13	7 31 13.01	1.667	25 4 51.9	8.22	8 6.5	13	8 7 48.67	3.936	22 39 20.5	15.43	6 41.4
14	7 31 54.29	1.771	25 1 31.9	8.45	8 3.3	14	8 9 23.68	3.983	22 33 7.1	15.68	6 39.0
15	7 32 38.04	1.873	24 58 6.5	8.68	8 0.1	15	8 10 59.80	4.028	22 26 47.5	15.94	6 36.7
16	7 33 24.21	+1.973	+24 54 35.6	- 8.90	7 56.9	16	8 12 36.99	+4.071	+22 20 21.8	-16.20	6 34.3
17	7 34 12.75	2.071	24 50 59.3	9.12	7 53.8	17	8 14 15.21	4.113	22 13 49.9	16.46	6 32.0
18	7 35 3.61	2.166	24 47 17.7	9.34	7 50.7	18	8 15 54.43	4.154	22 7 11.8	16.71	6 29.7
19	7 35 56.72	2.259	24 43 30.8	9.56	7 47.7	19	8 17 34.62	4.194	22 0 27.6	16.97	6 27.5
20	7 36 52.02	2.349	24 39 38.5	9.78	7 44.7	20	8 19 15.76	4.233	21 53 37.2	17.23	6 25.2
21	7 37 49.46	+2.437	+24 35 40.9	-10.00	7 41.7	21	8 20 57.80	+4.270	+21 46 40.5	-17.49	6 23.0
22	7 38 48.99	2.522	24 31 38.0	10.22	7 38.8	22	8 22 40.72	4.306	21 39 37.7	17.75	6 20.8
23	7 39 50.54	2.605	24 27 29.8	10.45	7 35.9	23	8 24 24.49	4.341	21 32 28.6	18.01	6 18.7
24	7 40 54.05	2.686	24 23 16.3	10.67	7 33.0	24	8 26 9.08	4.375	21 25 13.3	18.27	6 16.5
25	7 41 59.48	2.765	24 18 57.5	10.89	7 30.2	25	8 27 54.47	4.408	21 17 51.8	18.53	6 14.2
26	7 43 6.78	+2.842	+24 14 33.3	-11.11	7 27.4	26	8 29 40.63	+4.440	+21 10 24.1	-18.79	6 12.0
27	7 44 15.89	2.917	24 10 3.8	11.34	7 24.6	27	8 31 27.54	4.470	21 2 50.0	19.05	6 9.9
28	7 45 26.78	2.990	24 5 28.9	11.57	7 21.9	28	8 33 15.18	4.500	20 55 9.6	19.31	6 7.8
29	7 46 39.39	3.061	24 0 48.6	11.80	7 19.2	29	8 35 3.53	4.529	20 47 22.9	19.57	6 5.6
30	7 47 53.68	3.130	23 56 2.8	12.03	7 16.5	30	8 36 52.57	4.557	20 39 29.9	19.84	6 3.5
31	7 49 9.60	+3.197	+23 51 11.5	-12.26	7 13.8	31	8 38 42.29	+4.585	+20 31 30.4	-20.11	6 1.4
32	7 50 27.12	+3.263	+23 46 14.6	-12.49	7 11.1	32	8 40 32.66	+4.612	+20 23 24.6	-20.38	5 59.3
Day of the Month.						Day of the Month.					
2d. 7th. 12th. 17th. 22d. 27th.						1st. 6th. 11th. 16th. 21st. 26th.					
Semidiameter . . . 5.9 5.6 5.3 5.1 4.9 4.7						Semidiameter . . . 4.5 4.3 4.2 4.0 3.9 3.7					
Hor. Parallax . . . 10.3 9.8 9.4 9.0 8.6 8.2						Hor. Parallax . . . 7.9 7.6 7.3 7.0 6.8 6.5					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.									
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m				
1	8 38 42.29	+4.585	+20 31 30.4	-20.11	6 1.4	1	9 39 31.10	+5.133	+15 31 21.5	-28.15	5 0.1				
2	8 40 32.66	4.612	20 23 24.6	20.38	5 59.3	2	9 41 34.43	5.144	15 20 2.9	28.40	4 58.2				
3	8 42 23.67	4.638	20 15 12.3	20.65	5 57.2	3	9 43 38.02	5.155	15 8 38.5	28.64	4 56.3				
4	8 44 15.31	4.664	20 6 53.6	20.92	5 55.1	4	9 45 41.85	5.165	14 57 8.3	28.88	4 54.5				
5	8 46 7.55	4.689	19 58 28.4	21.19	5 53.0	5	9 47 45.93	5.175	14 45 32.4	29.12	4 52.6				
6	8 48 0.39	+4.713	+19 49 56.8	-21.46	5 51.0	6	9 49 50.25	+5.185	+14 33 50.7	-29.36	4 50.7				
7	8 49 53.80	4.737	19 41 18.7	21.72	5 49.0	7	9 51 54.81	5.194	14 22 3.4	29.59	4 48.9				
8	8 51 47.77	4.760	19 32 34.1	21.99	5 46.9	8	9 53 59.61	5.203	14 10 10.4	29.82	4 47.0				
9	8 53 42.28	4.783	19 23 43.1	22.26	5 44.9	9	9 56 4.62	5.212	13 58 11.8	30.05	4 45.1				
10	8 55 37.32	4.805	19 14 45.6	22.53	5 42.9	10	9 58 9.86	5.221	13 46 7.7	30.28	4 43.3				
11	8 57 32.88	+4.826	+19 5 41.7	-22.80	5 40.9	11	10 0 15.30	+5.229	+13 33 58.1	-30.51	4 41.4				
12	8 59 28.93	4.846	18 56 31.4	23.06	5 38.8	12	10 2 20.96	5.238	13 21 43.2	30.73	4 39.6				
13	9 1 25.46	4.865	18 47 14.6	23.33	5 36.8	13	10 4 26.81	5.246	13 9 23.0	30.95	4 37.8				
14	9 3 22.45	4.884	18 37 51.5	23.60	5 34.8	14	10 6 32.86	5.255	12 56 57.5	31.17	4 35.9				
15	9 5 19.88	4.902	18 28 22.0	23.86	5 32.9	15	10 8 39.09	5.263	12 44 26.7	31.39	4 34.1				
16	9 7 17.75	+4.919	+18 18 46.2	-24.13	5 30.9	16	10 10 45.52	+5.271	+12 31 50.8	-31.60	4 32.3				
17	9 9 16.03	4.936	18 9 4.2	24.38	5 28.9	17	10 12 52.11	5.276	12 19 9.8	31.81	4 30.4				
18	9 11 14.70	4.953	17 59 15.9	24.64	5 27.0	18	10 14 58.89	5.285	12 6 23.8	32.02	4 28.6				
19	9 13 13.76	4.969	17 49 21.4	24.90	5 25.0	19	10 17 5.82	5.292	11 53 32.9	32.22	4 26.8				
20	9 15 13.18	4.984	17 39 20.8	25.16	5 23.1	20	10 19 12.93	5.299	11 40 37.1	32.42	4 25.0				
21	9 17 12.96	+4.998	+17 29 14.0	-25.41	5 21.1	21	10 21 20.19	+5.306	+11 27 36.5	-32.62	4 23.1				
22	9 19 13.08	5.012	17 19 1.1	25.66	5 19.2	22	10 23 27.62	5.313	11 14 31.1	32.82	4 21.3				
23	9 21 13.54	5.026	17 8 42.1	25.92	5 17.3	23	10 25 35.20	5.319	11 1 21.0	33.02	4 19.5				
24	9 23 14.31	5.039	16 58 17.1	26.17	5 15.3	24	10 27 42.95	5.326	10 48 6.2	33.22	4 17.7				
25	9 25 15.40	5.052	16 47 46.0	26.42	5 13.4	25	10 29 50.85	5.332	10 34 46.8	33.41	4 15.9				
26	9 27 16.79	+5.064	+16 37 8.9	-26.67	5 11.5	26	10 31 58.91	+5.339	+10 21 22.8	-33.60	4 14.1				
27	9 29 18.47	5.076	16 26 25.9	26.92	5 9.6	27	10 34 7.13	5.346	10 7 54.2	33.79	4 12.3				
28	9 31 20.44	5.088	16 15 36.8	27.17	5 7.7	28	10 36 15.50	5.353	9 54 21.2	33.97	4 10.5				
29	9 33 22.70	5.100	16 4 41.9	27.42	5 5.8	29	10 38 24.04	5.360	9 40 43.7	34.15	4 8.7				
30	9 35 25.23	5.111	15 53 41.0	27.67	5 3.9	30	10 40 32.75	5.366	9 27 1.8	34.33	4 6.9				
31	9 37 28.03	+5.122	+15 42 34.2	-27.91	5 2.0	31	10 42 41.62	+5.373	+ 9 13 15.6	-34.51	4 5.1				
32	9 39 31.10	+5.133	+15 31 21.5	-28.15	5 0.1	32	10 44 50.66	+5.380	+ 8 59 25.1	-34.69	4 3.3				
Day of the Month.								Day of the Month.							
1st. 6th. 11th. 16th. 21st. 26th. 31st.								5th. 10th. 15th. 20th. 25th. 30th.							
Semidiameter . 3.6 3.5 3.4 3.3 3.2 3.1 3.0								Semidiameter . . . 2.9 2.9 2.8 2.8 2.7 2.7							
Hor. Parallax . 6.3 6.1 5.9 5.7 5.6 5.4 5.3								Hor. Parallax . . . 5.2 5.1 5.0 4.9 4.8 4.7							

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	10 42 41.62	+5.373	+9 13 15.6	-34.51	4 5.1	1	11 50 44.57	+5.616	+1 37 5.0	-38.55	3 11.0
2	10 44 50.66	5.380	8 59 25.1	34.69	4 3.3	2	11 52 59.49	5.626	1 21 38.8	38.63	3 9.3
3	10 46 59.87	5.387	8 45 30.3	34.87	4 1.5	3	11 55 14.65	5.636	1 6 10.8	38.71	3 7.6
4	10 49 9.26	5.394	8 31 31.4	35.04	3 59.7	4	11 57 30.06	5.647	0 50 40.9	38.78	3 5.9
5	10 51 18.81	5.401	8 17 28.4	35.21	3 57.9	5	11 59 45.73	5.658	0 35 9.4	38.85	3 4.2
6	10 53 28.54	+5.409	+8 3 21.3	-35.38	3 56.1	6	12 2 1.66	+5.669	+0 19 36.3	-38.91	3 2.5
7	10 55 38.45	5.416	7 49 10.3	35.54	3 54.3	7	12 4 17.85	5.680	+0 4 1.7	38.97	3 0.8
8	10 57 48.53	5.423	7 34 55.5	35.70	3 52.6	8	12 6 34.32	5.691	-0 11 34.3	39.02	2 59.2
9	10 59 58.78	5.430	7 20 36.9	35.86	3 50.8	9	12 8 51.05	5.702	0 27 11.6	39.07	2 57.6
10	11 2 9.20	5.437	7 6 14.5	36.01	3 49.1	10	12 11 8.05	5.714	0 42 50.1	39.12	2 55.9
11	11 4 19.80	+5.445	+6 51 48.5	-36.16	3 47.3	11	12 13 25.33	+5.725	-0 58 29.6	-39.16	2 54.3
12	11 6 30.57	5.452	6 37 18.9	36.30	3 45.5	12	12 15 42.89	5.737	1 14 10.1	39.20	2 52.6
13	11 8 41.51	5.459	6 22 45.9	36.44	3 43.8	13	12 18 0.73	5.749	1 29 51.5	39.23	2 51.0
14	11 10 52.63	5.466	6 8 9.6	36.58	3 42.0	14	12 20 18.86	5.761	1 45 33.6	39.26	2 49.4
15	11 13 3.92	5.473	5 53 29.9	36.72	3 40.3	15	12 22 37.27	5.773	2 1 16.3	39.29	2 47.7
16	11 15 15.39	+5.481	+5 38 46.9	-36.85	3 38.5	16	12 24 55.98	+5.785	-2 16 59.6	-39.31	2 46.0
17	11 17 27.03	5.488	5 24 0.9	36.98	3 36.8	17	12 27 14.99	5.797	2 32 43.4	39.33	2 44.4
18	11 19 38.85	5.495	5 9 11.8	37.11	3 35.0	18	12 29 34.31	5.809	2 48 27.5	39.35	2 42.8
19	11 21 50.84	5.503	4 54 19.8	37.23	3 33.3	19	12 31 53.93	5.822	3 4 11.9	39.36	2 41.2
20	11 24 3.01	5.511	4 39 24.8	37.35	3 31.6	20	12 34 13.87	5.835	3 19 56.5	39.37	2 39.6
21	11 26 15.37	+5.519	+4 24 27.1	-37.46	3 29.8	21	12 36 34.13	+5.849	-3 35 41.1	-39.37	2 38.0
22	11 28 27.91	5.527	4 9 26.5	37.57	3 28.1	22	12 38 54.72	5.864	3 51 25.7	39.36	2 36.4
23	11 30 40.64	5.535	3 54 23.3	37.68	3 26.4	23	12 41 15.65	5.879	4 7 10.2	39.35	2 34.8
24	11 32 53.56	5.543	3 39 17.5	37.79	3 24.7	24	12 43 36.92	5.894	4 22 54.5	39.34	2 33.3
25	11 35 6.68	5.551	3 24 9.1	37.90	3 23.0	25	12 45 58.55	5.909	4 38 38.5	39.33	2 31.7
26	11 37 20.01	+5.560	+3 8 58.3	-38.00	3 21.2	26	12 48 20.54	+5.924	-4 54 22.1	-39.31	2 30.1
27	11 39 33.55	5.569	2 53 45.0	38.10	3 19.5	27	12 50 42.89	5.939	5 10 5.2	39.29	2 28.5
28	11 41 47.30	5.578	2 38 29.4	38.20	3 17.8	28	12 53 5.61	5.955	5 25 47.7	39.26	2 26.9
29	11 44 1.27	5.587	2 23 11.5	38.29	3 16.1	29	12 55 28.72	5.971	5 41 29.5	39.23	2 25.4
30	11 46 15.47	5.596	2 7 51.4	38.38	3 14.4	30	12 57 52.22	5.987	5 57 10.5	39.19	2 23.8
31	11 48 29.90	+5.606	+1 52 29.2	-38.47	3 12.7	31	13 0 16.11	+6.004	-6 12 50.5	-39.14	2 22.3
32	11 50 44.57	+5.616	+1 37 5.0	-38.55	3 11.0	32	13 2 40.41	+6.021	-6 28 29.5	-39.09	2 20.7
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter . . . 2.6 2.6 2.5 2.5 2.4 2.4						Semidiameter . . . 2.4 2.4 2.3 2.3 2.3 2.3					
Hor. Parallax . . . 4.6 4.5 4.4 4.4 4.3 4.3						Hor. Parallax . . . 4.2 4.2 4.1 4.1 4.0 4.0					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.															
SEPTEMBER.						OCTOBER.									
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
1	h m s	s	° ' "	"	h m	1	h m s	s	° ' "	"	h m				
1	13 2 40.41	+6.021	- 6 28 29.5	-39.09	2 20.7	1	14 18 23.35	+6.636	-13 59 10.9	-35.17	1 38.3				
2	13 5 5.12	6.038	6 44 7.3	39.04	2 19.2	2	14 21 2.91	6.660	14 13 12.5	34.95	1 37.0				
3	13 7 30.24	6.055	6 59 43.9	38.99	2 17.7	3	14 23 43.06	6.685	14 27 8.8	34.78	1 35.7				
4	13 9 55.79	6.073	7 15 19.0	38.93	2 16.2	4	14 26 23.80	6.710	14 40 59.5	34.49	1 34.4				
5	13 12 21.76	6.091	7 30 52.6	38.86	2 14.7	5	14 29 5.14	6.735	14 54 44.4	34.25	1 33.2				
6	13 14 48.16	+6.109	- 7 46 24.5	-38.79	2 13.2	6	14 31 47.08	+6.760	-15 8 23.5	-34.00	1 31.9				
7	13 17 14.99	6.127	8 1 54.6	38.71	2 11.7	7	14 34 29.62	6.785	15 21 56.5	33.74	1 30.7				
8	13 19 42.27	6.145	8 17 22.7	38.63	2 10.2	8	14 37 12.77	6.810	15 35 23.3	33.48	1 29.5				
9	13 22 9.99	6.164	8 32 48.8	38.54	2 8.7	9	14 39 56.52	6.836	15 48 43.7	33.21	1 28.3				
10	13 24 38.15	6.183	8 48 12.7	38.44	2 7.2	10	14 42 40.88	6.861	16 1 57.6	32.93	1 27.1				
11	13 27 6.77	+6.202	- 9 3 34.2	-38.34	2 5.7	11	14 45 25.85	+6.886	-16 15 4.7	-32.64	1 25.9				
12	13 29 35.85	6.221	9 18 53.3	38.23	2 4.3	12	14 48 11.43	6.911	16 28 5.0	32.35	1 24.7				
13	13 32 5.39	6.240	9 34 9.8	38.12	2 2.9	13	14 50 57.63	6.937	16 40 58.3	32.06	1 23.6				
14	13 34 35.39	6.260	9 49 23.5	38.01	2 1.4	14	14 53 44.44	6.963	16 53 44.3	31.76	1 22.4				
15	13 37 5.87	6.280	10 4 34.3	37.89	2 0.0	15	14 56 31.87	6.989	17 6 23.0	31.45	1 21.3				
16	13 39 36.82	+6.300	-10 19 42.2	-37.76	1 58.6	16	14 59 19.93	+7.015	-17 18 54.1	-31.13	1 20.1				
17	13 42 8.26	6.320	10 34 46.9	37.63	1 57.2	17	15 2 8.62	7.041	17 31 17.5	30.80	1 19.0				
18	13 44 40.19	6.341	10 49 48.4	37.49	1 55.8	18	15 4 57.93	7.067	17 43 33.0	30.47	1 17.9				
19	13 47 12.62	6.362	11 4 46.5	37.35	1 54.4	19	15 7 47.88	7.094	17 55 40.5	30.14	1 16.8				
20	13 49 45.55	6.383	11 19 41.1	37.20	1 53.0	20	15 10 38.46	7.121	18 7 39.8	29.80	1 15.7				
21	13 52 19.00	+6.405	-11 34 32.0	-37.04	1 51.6	21	15 13 29.68	+7.148	-18 19 30.8	-29.45	1 14.6				
22	13 54 52.97	6.427	11 49 19.2	36.88	1 50.2	22	15 16 21.55	7.175	18 31 13.2	29.09	1 13.5				
23	13 57 27.47	6.449	12 4 2.5	36.72	1 48.9	23	15 19 14.07	7.202	18 42 46.9	28.78	1 12.4				
24	14 0 2.51	6.471	12 18 41.7	36.55	1 47.5	24	15 22 7.23	7.229	18 54 11.8	28.35	1 11.3				
25	14 2 38.08	6.494	12 33 16.7	36.37	1 46.2	25	15 25 1.04	7.256	19 5 27.6	27.97	1 10.3				
26	14 5 14.21	+6.517	-12 47 47.4	-36.18	1 44.8	26	15 27 55.51	+7.283	-19 16 34.2	-27.58	1 9.2				
27	14 7 50.90	6.540	13 2 13.6	35.99	1 43.5	27	15 30 50.63	7.310	19 27 31.4	27.19	1 8.2				
28	14 10 28.15	6.564	13 16 35.2	35.80	1 42.2	28	15 33 46.41	7.337	19 38 19.1	26.79	1 7.2				
29	14 13 5.97	6.588	13 30 52.1	35.60	1 40.9	29	15 36 42.84	7.365	19 48 57.0	26.38	1 6.2				
30	14 15 44.37	6.612	13 45 4.0	35.39	1 39.6	30	15 39 39.93	7.392	19 59 25.1	25.96	1 5.2				
31	14 18 23.35	+6.636	-13 59 10.9	-35.17	1 38.3	31	15 42 37.67	+7.419	-20 9 43.1	-25.53	1 4.3				
32	14 21 2.91	+6.660	-14 13 12.5	-34.95	1 37.0	32	15 45 36.05	+7.446	-20 19 50.8	-25.10	1 3.3				
Day of the Month.		8d.	8th.	18th.	18th.	28d.	28th.	Day of the Month.		8d.	8th.	18th.	18th.	28d.	28th.
Semidiameter . . .		2.2	2.2	2.2	2.2	2.2	2.2	Semidiameter . . .		2.2	2.2	2.1	2.1	2.1	2.1
Hor. Parallax . . .		3.9	3.9	3.9	3.8	3.8	3.8	Hor. Parallax . . .		3.8	3.8	3.7	3.7	3.7	3.7
NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.															

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.												
NOVEMBER.						DECEMBER.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	15 45 36.05	+7.446	20 19 50.8	-25.10	1 3.3	1	17 19 22.28	+8.138	23 50 26.0	-9.04	0 38.9	
2	15 48 35.08	7.473	20 29 48.1	24.66	1 2.4	2	17 22 37.78	8.155	23 53 55.6	8.42	0 38.2	
3	15 51 34.75	7.499	20 39 34.7	24.22	1 1.4	3	17 25 53.69	8.171	23 57 10.2	7.79	0 37.5	
4	15 54 35.05	7.525	20 49 10.6	23.77	1 0.5	4	17 29 9.98	8.187	24 0 9.6	7.16	0 36.8	
5	15 57 35.99	7.551	20 58 35.5	23.31	0 59.5	5	17 32 26.65	8.202	24 2 53.8	6.52	0 36.2	
6	16 0 37.55	+7.577	21 7 49.3	-22.84	0 58.6	6	17 35 43.66	+8.216	24 5 22.6	-5.88	0 35.5	
7	16 3 39.74	7.603	21 16 51.7	22.36	0 57.7	7	17 39 1.02	8.230	24 7 36.0	5.24	0 34.9	
8	16 6 42.54	7.629	21 25 42.7	21.88	0 56.8	8	17 42 18.70	8.243	24 9 33.9	4.59	0 34.2	
9	16 9 45.95	7.654	21 34 22.0	21.39	0 55.9	9	17 45 36.68	8.255	24 11 16.1	3.94	0 33.6	
10	16 12 49.97	7.679	21 42 49.5	20.89	0 55.1	10	17 48 54.95	8.267	24 12 42.7	3.29	0 32.9	
11	16 15 54.58	+7.704	21 51 5.1	-20.39	0 54.2	11	17 52 13.50	+8.278	24 13 53.5	-2.63	0 32.3	
12	16 18 59.78	7.729	21 59 8.5	19.88	0 53.4	12	17 55 32.31	8.289	24 14 48.5	1.97	0 31.7	
13	16 22 5.57	7.753	22 6 59.7	19.37	0 52.5	13	17 58 51.36	8.299	24 15 27.6	1.30	0 31.0	
14	16 25 11.94	7.777	22 14 38.4	18.85	0 51.7	14	18 2 10.64	8.308	24 15 50.8	-0.63	0 30.4	
15	16 28 18.88	7.801	22 22 4.4	18.32	0 50.8	15	18 5 30.14	8.316	24 15 58.0	+0.04	0 29.8	
16	16 31 26.39	+7.825	22 29 17.7	-17.79	0 50.0	16	18 8 49.84	+8.324	24 15 49.1	+0.71	0 29.2	
17	16 34 34.46	7.848	22 36 18.1	17.25	0 49.2	17	18 12 9.72	8.332	24 15 24.2	1.38	0 28.6	
18	16 37 43.09	7.871	22 43 5.4	16.70	0 48.4	18	18 15 29.78	8.339	24 14 43.1	2.05	0 27.9	
19	16 40 52.26	7.893	22 49 39.5	16.14	0 47.6	19	18 18 49.99	8.345	24 13 45.9	2.72	0 27.3	
20	16 44 1.98	7.915	22 56 0.2	15.58	0 46.8	20	18 22 10.35	8.351	24 12 32.4	3.39	0 26.7	
21	16 47 12.24	+7.937	23 2 7.4	-15.01	0 46.0	21	18 25 30.84	+8.356	24 11 2.7	+4.07	0 26.1	
22	16 50 23.02	7.959	23 8 1.0	14.44	0 45.3	22	18 28 51.45	8.361	24 9 16.7	4.75	0 25.5	
23	16 53 34.32	7.981	23 13 40.8	13.87	0 44.5	23	18 32 12.16	8.365	24 7 14.5	5.43	0 24.9	
24	16 56 46.13	8.002	23 19 6.6	13.29	0 43.8	24	18 35 32.96	8.368	24 4 56.0	6.11	0 24.3	
25	16 59 58.45	8.022	23 24 18.4	12.70	0 43.1	25	18 38 53.82	8.371	24 2 21.2	6.79	0 23.7	
26	17 3 11.26	+8.043	23 29 15.9	-12.10	0 42.4	26	18 42 14.73	+8.375	23 59 30.1	+7.47	0 23.1	
27	17 6 24.55	8.063	23 33 59.1	11.50	0 41.7	27	18 45 35.68	8.374	23 56 22.7	8.15	0 22.6	
28	17 9 38.31	8.083	23 38 27.8	10.89	0 41.0	28	18 48 56.63	8.374	23 52 59.0	8.83	0 22.0	
29	17 12 52.53	8.102	23 42 42.0	10.28	0 40.3	29	18 52 17.61	8.374	23 49 19.1	9.51	0 21.4	
30	17 16 7.19	8.120	23 46 41.4	9.66	0 39.6	30	18 55 38.57	8.373	23 45 23.0	10.18	0 20.8	
31	17 19 22.28	+8.138	23 50 26.0	-9.04	0 38.9	31	18 58 59.50	+8.371	23 41 10.8	+10.85	0 20.2	
32	17 22 37.78	+8.155	23 53 55.6	-8.42	0 38.2	32	19 2 20.37	+8.368	23 36 42.3	+11.52	0 19.6	
Day of the Month.						Day of the Month.						
2d. 7th. 12th. 17th. 22d. 27th.						2d. 7th. 12th. 17th. 22d. 27th. 32d.						
Semidiameter . . .						Semidiameter .						
Hor. Parallax . . .						Hor. Parallax .						
2.1 2.1 2.1 2.1 2.1 2.1						2.1 2.1 2.1 2.1 2.1 2.1 2.1						
3.7 3.7 3.7 3.7 3.7 3.7						3.7 3.7 3.7 3.7 3.7 3.7 3.7						
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.												

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	14 16 33.93	+1.402	-12 26 17.4	-6.77	19 30.1	1	14 29 45.00	+0.680	-13 26 18.6	-2.79	17 41.1
2	14 17 7.33	1.383	12 28 58.4	6.66	19 26.7	2	14 30 0.97	0.652	13 27 23.8	2.65	17 37.5
3	14 17 40.29	1.364	12 31 36.7	6.54	19 23.3	3	14 30 16.27	0.624	13 28 25.6	2.50	17 33.8
4	14 18 12.79	1.344	12 34 12.2	6.43	19 19.9	4	14 30 30.90	0.596	13 29 23.9	2.36	17 30.1
5	14 18 44.81	1.324	12 36 44.8	6.31	19 16.5	5	14 30 44.85	0.567	13 30 18.9	2.22	17 26.4
6	14 19 16.36	+1.304	-12 39 14.6	-6.19	19 13.1	6	14 30 58.10	+0.538	-13 31 10.5	-2.07	17 22.6
7	14 19 47.43	1.284	12 41 41.5	6.06	19 9.7	7	14 31 10.66	0.509	13 31 58.6	1.93	17 18.9
8	14 20 18.01	1.263	12 44 5.5	5.94	19 6.3	8	14 31 22.53	0.480	13 32 43.3	1.79	17 15.2
9	14 20 48.08	1.242	12 46 26.6	5.82	19 2.9	9	14 31 33.69	0.450	13 33 24.5	1.64	17 11.4
10	14 21 17.64	1.221	12 48 44.7	5.69	18 59.4	10	14 31 44.14	0.421	13 34 2.2	1.50	17 7.6
11	14 21 46.69	+1.199	-12 50 59.9	-5.57	18 56.0	11	14 31 53.88	+0.391	-13 34 36.5	-1.36	17 3.9
12	14 22 15.21	1.177	12 53 12.1	5.45	18 52.5	12	14 32 2.91	0.361	13 35 7.3	1.21	17 0.1
13	14 22 43.19	1.155	12 55 21.3	5.42	18 49.0	13	14 32 11.21	0.331	13 35 34.6	1.07	16 56.3
14	14 23 10.63	1.132	12 57 27.4	5.30	18 45.5	14	14 32 18.79	0.301	13 35 58.4	0.92	16 52.4
15	14 23 37.54	1.109	12 59 30.5	5.07	18 42.0	15	14 32 25.65	0.271	13 36 18.7	0.77	16 48.6
16	14 24 3.89	+1.086	-13 1 30.5	-4.94	18 38.5	16	14 32 31.79	+0.241	-13 36 35.4	-0.63	16 44.8
17	14 24 29.68	1.063	13 3 27.4	4.81	18 35.0	17	14 32 37.20	0.210	13 36 48.8	0.48	16 40.9
18	14 24 54.90	1.039	13 5 21.1	4.68	18 31.5	18	14 32 41.87	0.179	13 36 58.6	0.33	16 37.1
19	14 25 19.56	1.015	13 7 11.7	4.55	18 28.0	19	14 32 45.81	0.149	13 37 4.9	0.18	16 33.2
20	14 25 43.63	0.991	13 8 59.3	4.42	18 24.4	20	14 32 49.02	0.119	13 37 7.7	-0.04	16 29.3
21	14 26 7.11	+0.966	-13 10 43.7	-4.29	18 20.9	21	14 32 51.50	+0.088	-13 37 7.0	+0.10	16 25.4
22	14 26 30.00	0.941	13 12 24.9	4.15	18 17.3	22	14 32 53.24	0.057	13 37 2.9	0.85	16 21.5
23	14 26 52.30	0.916	13 14 2.8	4.02	18 13.8	23	14 32 54.25	+0.026	13 36 55.3	0.40	16 17.6
24	14 27 14.00	0.891	13 15 37.5	3.89	18 10.2	24	14 32 54.52	-0.004	13 36 44.2	0.54	16 13.7
25	14 27 35.08	0.865	13 17 9.0	3.75	18 6.6	25	14 32 54.06	0.033	13 36 29.6	0.69	16 9.7
26	14 27 55.54	+0.839	-13 18 37.4	-3.62	18 3.0	26	14 32 52.86	-0.066	-13 36 11.5	+0.83	16 5.8
27	14 28 15.37	0.813	13 20 2.6	3.48	17 59.4	27	14 32 50.92	0.096	13 35 50.0	0.97	16 1.8
28	14 28 34.58	0.787	13 21 24.4	3.34	17 55.8	28	14 32 48.25	0.127	13 35 25.0	1.12	15 57.8
29	14 28 53.15	0.761	13 22 42.9	3.21	17 52.2	29	14 32 44.84	0.158	13 34 56.5	1.26	15 53.8
30	14 29 11.08	0.734	13 23 58.1	3.07	17 48.5	30	14 32 40.70	0.188	13 34 24.6	1.40	15 49.8
31	14 29 28.37	+0.707	-13 25 10.0	-2.93	17 44.8	31	14 32 35.82	-0.219	-13 33 49.2	+1.55	15 45.8
32	14 29 45.00	+0.680	-13 26 18.6	-2.79	17 41.1	32	14 32 30.20	-0.249	-13 33 10.5	+1.69	15 41.7
Day of the Month.		8d.	11th.	19th.	27th.	Day of the Month.		4th.	12th.	20th.	28th.
Semidiameter . . . . .		16.3	16.7	17.1	17.5	Semidiameter . . . . .		17.9	18.4	18.8	19.3
Horizontal Parallax . . .		1.5	1.6	1.6	1.6	Horizontal Parallax . . .		1.7	1.7	1.8	1.8

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	14 32 44.84	-0.158	-13 34 56.5	+1.26	15 53.8	1	14 25 18.58	-0.984	-12 53 46.1	+5.11	13 44.3	
2	14 32 40.70	0.188	13 34 24.6	1.40	15 49.8	2	14 24 54.74	1.003	12 51 42.2	5.20	13 40.0	
3	14 32 35.82	0.219	13 33 49.2	1.55	15 45.8	3	14 24 30.44	1.021	12 49 36.3	5.29	13 35.6	
4	14 32 30.20	0.249	13 33 10.5	1.69	15 41.7	4	14 24 5.70	1.038	12 47 28.5	5.37	13 31.3	
5	14 32 23.86	0.279	13 32 28.3	1.83	15 37.7	5	14 23 40.55	1.055	12 45 18.7	5.45	13 26.9	
6	14 32 16.79	-0.310	-13 31 42.7	+1.98	15 33.6	6	14 23 14.98	-1.072	-12 43 6.9	+5.53	13 22.6	
7	14 32 8.99	0.340	13 30 53.7	2.12	15 29.6	7	14 22 49.02	1.089	12 40 53.3	5.60	13 18.2	
8	14 32 0.47	0.370	13 30 1.3	2.26	15 25.5	8	14 22 22.69	1.105	12 38 38.0	5.67	13 13.8	
9	14 31 51.23	0.400	13 29 5.6	2.40	15 21.4	9	14 21 56.01	1.120	12 36 21.0	5.74	13 9.5	
10	14 31 41.27	0.430	13 28 6.6	2.54	15 17.3	10	14 21 28.98	1.133	12 34 2.4	5.81	13 5.1	
11	14 31 30.61	-0.459	-13 27 4.2	+2.67	15 13.2	11	14 21 1.64	-1.145	-12 31 42.4	+5.87	13 0.7	
12	14 31 19.24	0.488	13 25 58.5	2.81	15 9.0	12	14 20 34.02	1.157	12 29 21.2	5.92	12 56.3	
13	14 31 7.18	0.517	13 24 49.6	2.94	15 4.9	13	14 20 6.13	1.168	12 26 58.7	5.96	12 51.9	
14	14 30 54.44	0.545	13 23 37.6	3.07	15 0.7	14	14 19 37.98	1.178	12 24 35.0	6.01	12 47.5	
15	14 30 41.02	0.573	13 22 22.4	3.20	14 56.6	15	14 19 9.59	1.187	12 22 10.3	6.05	12 43.1	
16	14 30 26.91	-0.601	-13 21 4.1	+3.33	14 52.4	16	14 18 40.99	-1.196	-12 19 44.7	+6.09	12 38.7	
17	14 30 12.13	0.629	13 19 42.7	3.46	14 48.2	17	14 18 12.20	1.204	12 17 18.1	6.12	12 34.3	
18	14 29 56.71	0.656	13 18 18.3	3.58	14 44.0	18	14 17 43.24	1.211	12 14 50.8	6.14	12 29.9	
19	14 29 40.66	0.682	13 16 50.9	3.70	14 39.8	19	14 17 14.13	1.216	12 12 22.9	6.16	12 25.5	
20	14 29 23.98	0.708	13 15 20.6	3.82	14 35.6	20	14 16 44.89	1.221	12 9 54.5	6.18	12 21.1	
21	14 29 6.67	-0.734	-13 13 47.4	+3.94	14 31.4	21	14 16 15.54	-1.225	-12 7 25.5	+6.20	12 16.6	
22	14 28 48.76	0.759	13 12 11.4	4.06	14 27.1	22	14 15 46.10	1.228	12 4 56.2	6.22	12 12.2	
23	14 28 30.25	0.784	13 10 32.6	4.18	14 22.9	23	14 15 16.59	1.230	12 2 26.8	6.23	12 7.8	
24	14 28 11.13	0.808	13 8 50.9	4.29	14 18.7	24	14 14 47.03	1.232	11 59 57.2	6.24	12 3.4	
25	14 27 51.44	0.832	13 7 6.6	4.40	14 14.4	25	14 14 17.44	1.233	11 57 27.5	6.24	11 59.0	
26	14 27 31.19	-0.855	-13 5 19.7	+4.51	14 10.1	26	14 13 47.84	-1.233	-11 54 57.8	+6.23	11 54.5	
27	14 27 10.40	0.878	13 3 30.2	4.62	14 5.8	27	14 13 18.25	1.232	11 52 28.4	6.22	11 50.1	
28	14 26 49.07	0.900	13 1 38.2	4.72	14 1.5	28	14 12 48.69	1.231	11 49 59.2	6.21	11 45.7	
29	14 26 27.21	0.922	12 59 43.7	4.82	13 57.2	29	14 12 19.17	1.229	11 47 30.3	6.19	11 41.3	
30	14 26 4.83	0.943	12 57 46.9	4.92	13 52.9	30	14 11 49.72	1.226	11 45 1.9	6.17	11 36.8	
31	14 25 41.95	-0.964	-12 55 47.7	+5.02	13 48.6	31	14 11 20.36	-1.221	-11 42 34.2	+6.14	11 32.4	
32	14 25 18.58	-0.984	-12 53 46.1	+5.11	13 44.3	32	14 10 51.11	-1.216	-11 40 7.2	+6.11	11 28.0	
Day of the Month.			8th.	16th.	24th.	Day of the Month.			1st.	9th.	17th.	25th.
Semidiameter . . . . .			"	"	"	Semidiameter . . . . .			"	"	"	"
Horizontal Parallax . . . . .			19.7	20.1	20.5	Horizontal Parallax . . . . .			20.8	21.0	21.2	21.3
			1.9	1.9	1.9				2.0	2.0	2.0	2.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.



## GREENWICH MEAN TIME.

MAY.						JUNE.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m						
1	14 11 20.36	-1.221	-11 42 34.2	+6.14	11 32.4	1	13 58 35.81	-0.731	-10 40 9.7	+3.36	9 18.0						
2	14 10 51.11	1.216	11 40 7.2	6.11	11 28.0	2	13 58 18.56	0.707	10 38 50.8	3.22	9 13.8						
3	14 10 21.99	1.210	11 37 40.8	6.08	11 23.6	3	13 58 1.90	0.682	10 37 35.2	3.08	9 9.5						
4	14 9 53.02	1.204	11 35 15.4	6.04	11 19.2	4	13 57 45.83	0.657	10 36 22.9	2.94	9 5.3						
5	14 9 24.21	1.196	11 32 51.1	5.99	11 14.8	5	13 57 30.37	0.631	10 35 14.1	2.80	9 1.2						
6	14 8 55.59	-1.188	-11 30 27.8	+5.94	11 10.4	6	13 57 15.54	-0.605	-10 34 8.8	+2.65	8 57.0						
7	14 8 27.18	1.179	11 28 5.7	5.89	11 6.0	7	13 57 1.34	0.579	10 33 7.1	2.50	8 52.8						
8	14 7 59.00	1.169	11 25 45.0	5.83	11 1.6	8	13 56 47.77	0.552	10 32 8.9	2.35	8 48.6						
9	14 7 31.07	1.158	11 23 25.7	5.77	10 57.2	9	13 56 34.85	0.525	10 31 14.4	2.19	8 44.5						
10	14 7 3.41	1.147	11 21 8.0	5.70	10 52.8	10	13 56 22.58	0.498	10 30 23.6	2.04	8 40.4						
11	14 6 36.02	-1.135	+11 18 51.9	+5.63	10 48.4	11	13 56 10.96	-0.471	-10 29 36.4	+1.89	8 36.3						
12	14 6 8.93	1.122	11 16 37.5	5.56	10 44.0	12	13 56 0.00	0.443	10 28 52.7	1.74	8 32.2						
13	14 5 42.17	1.107	11 14 25.1	5.48	10 39.7	13	13 55 49.70	0.415	10 28 12.9	1.59	8 28.1						
14	14 5 15.77	1.092	11 12 14.6	5.40	10 35.3	14	13 55 40.07	0.387	10 27 36.9	1.43	8 24.0						
15	14 4 49.74	1.077	11 10 6.1	5.31	10 30.9	15	13 55 31.12	0.359	10 27 4.6	1.27	8 19.9						
16	14 4 24.09	-1.061	-11 7 59.7	+5.22	10 26.6	16	13 55 22.85	-0.331	-10 26 36.0	+1.12	8 15.8						
17	14 3 58.81	1.044	11 5 55.6	5.13	10 22.2	17	13 55 15.25	0.303	10 26 11.2	0.96	8 11.8						
18	14 3 33.93	1.027	11 3 53.8	5.03	10 17.9	18	13 55 8.33	0.274	10 25 50.2	0.80	8 7.7						
19	14 3 9.47	1.010	11 1 54.3	4.93	10 13.5	19	13 55 2.09	0.246	10 25 33.0	0.64	8 3.7						
20	14 2 45.46	0.992	10 59 57.2	4.82	10 9.2	20	13 54 56.54	0.218	10 25 19.6	0.48	7 59.7						
21	14 2 21.90	-0.973	-10 58 2.7	+4.71	10 4.9	21	13 54 51.67	-0.189	-10 25 10.1	+0.32	7 55.7						
22	14 1 58.80	0.953	10 56 10.9	4.60	10 0.6	22	13 54 47.48	0.161	10 25 4.3	0.16	7 51.7						
23	14 1 36.17	0.933	10 54 21.7	4.49	9 56.3	23	13 54 43.96	0.133	10 25 2.2	+0.01	7 47.7						
24	14 1 14.03	0.912	10 52 35.1	4.38	9 52.0	24	13 54 41.13	0.104	10 25 3.9	-0.15	7 43.7						
25	14 0 52.39	0.891	10 50 51.4	4.26	9 47.7	25	13 54 38.99	0.076	10 25 9.4	0.31	7 39.8						
26	14 0 31.26	-0.869	-10 49 10.7	+4.14	9 43.4	26	13 54 37.53	-0.047	-10 25 18.7	-0.47	7 35.8						
27	14 0 10.65	0.847	10 47 32.9	4.02	9 39.2	27	13 54 36.75	-0.018	10 25 31.9	0.63	7 31.9						
28	13 59 50.57	0.825	10 45 58.0	3.89	9 34.9	28	13 54 36.65	+0.010	10 25 48.8	0.79	7 27.9						
29	13 59 31.04	0.802	10 44 26.2	3.76	9 30.7	29	13 54 37.24	0.039	10 26 9.4	0.95	7 24.0						
30	13 59 12.06	0.779	10 42 57.5	3.63	9 26.4	30	13 54 38.51	0.067	10 26 33.8	1.10	7 20.1						
31	13 58 53.65	-0.755	-10 41 32.0	+3.50	9 22.2	31	13 54 40.46	+0.096	-10 27 2.1	-1.26	7 16.2						
32	13 58 35.81	-0.731	-10 40 9.7	+3.36	9 18.0	32	13 54 43.10	+0.125	-10 27 34.2	-1.42	7 12.3						
Day of the Month.					8d.	11th.	19th.	27th.	Day of the Month.					8th.	19th.	29th.	30th.
Semidiameter . . . .					21.2	21.1	20.9	20.6	Semidiameter . . . .					20.3	19.9	19.5	19.1
Horizontal Parallax . .					2.0	2.0	2.0	1.9	Horizontal Parallax . .					1.9	1.9	1.8	1.8

NOTE.—The sign + indicates north declinations; the sign — indicates south declination.

**GREENWICH MEAN TIME.**

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	13 54 40.46	+0.096	-10 27 2.1	-1.26	7 16.2	1	14 1 6.77	+0.916	-11 10 44.2	-5.58	5 20.8
2	13 54 43.10	0.125	10 27 34.2	1.42	7 12.3	2	14 1 29.04	0.940	11 12 59.6	5.70	5 17.3
3	13 54 46.42	0.153	10 28 10.0	1.57	7 8.4	3	14 1 51.87	0.963	11 15 17.8	5.82	5 13.7
4	13 54 50.42	0.182	10 28 49.5	1.73	7 4.6	4	14 2 15.26	0.986	11 17 38.8	5.93	5 10.1
5	13 54 55.10	0.210	10 29 32.7	1.88	7 0.7	5	14 2 39.21	1.009	11 20 2.4	6.04	5 6.6
6	13 55 0.47	+0.238	-10 30 19.5	-2.03	6 56.9	6	14 3 3.71	+1.032	-11 22 28.7	-6.15	5 3.1
7	13 55 6.51	0.266	10 31 10.1	2.19	6 53.1	7	14 3 28.76	1.055	11 24 57.6	6.26	4 59.6
8	13 55 13.22	0.294	10 32 4.3	2.34	6 49.3	8	14 3 54.35	1.077	11 27 29.2	6.37	4 56.1
9	13 55 20.61	0.322	10 33 2.2	2.49	6 45.5	9	14 4 20.47	1.099	11 30 3.2	6.47	4 52.6
10	13 55 28.67	0.350	10 34 3.7	2.64	6 41.7	10	14 4 47.12	1.121	11 32 39.7	6.57	4 49.1
11	13 55 37.39	+0.378	-10 35 8.8	-2.79	6 37.9	11	14 5 14.29	+1.143	-11 35 18.7	-6.67	4 45.6
12	13 55 46.78	0.405	10 36 17.4	2.93	6 34.1	12	14 5 41.98	1.164	11 38 0.1	6.77	4 42.1
13	13 55 56.83	0.432	10 37 29.5	3.08	6 30.3	13	14 6 10.18	1.185	11 40 43.8	6.87	4 38.7
14	13 56 7.53	0.459	10 38 45.2	3.23	6 26.6	14	14 6 38.88	1.206	11 43 29.8	6.97	4 35.2
15	13 56 18.88	0.486	10 40 4.3	3.37	6 22.8	15	14 7 8.09	1.227	11 46 18.2	7.06	4 31.8
16	13 56 30.87	+0.513	-10 41 26.8	-3.51	6 19.1	16	14 7 37.79	+1.247	-11 49 8.8	-7.15	4 28.3
17	13 56 43.51	0.540	10 42 52.7	3.65	6 15.4	17	14 8 7.97	1.267	11 52 1.5	7.24	4 24.9
18	13 56 56.79	0.566	10 44 22.0	3.79	6 11.7	18	14 8 38.63	1.287	11 54 56.3	7.33	4 21.5
19	13 57 10.69	0.592	10 45 54.7	3.93	6 8.0	19	14 9 9.78	1.307	11 57 53.3	7.42	4 18.1
20	13 57 25.21	0.618	10 47 30.6	4.06	6 4.3	20	14 9 41.39	1.327	12 0 52.3	7.50	4 14.7
21	13 57 40.36	+0.644	-10 49 9.7	-4.19	6 0.6	21	14 10 13.46	+1.346	-12 3 53.3	-7.58	4 11.3
22	13 57 56.14	0.670	10 50 51.9	4.33	5 56.9	22	14 10 45.99	1.365	12 6 56.2	7.66	4 7.9
23	13 58 12.53	0.695	10 52 37.3	4.46	5 53.3	23	14 11 18.97	1.384	12 10 1.1	7.74	4 4.5
24	13 58 29.52	0.720	10 54 26.0	4.59	5 49.6	24	14 11 52.41	1.403	12 13 7.9	7.83	4 1.1
25	13 58 47.11	0.745	10 56 17.8	4.72	5 46.0	25	14 12 26.29	1.421	12 16 16.5	7.90	3 57.7
26	13 59 5.29	+0.770	-10 58 12.7	-4.85	5 42.4	26	14 13 0.61	+1.439	-12 19 26.9	-7.97	3 54.3
27	13 59 24.06	0.795	11 0 10.6	4.97	5 38.8	27	14 13 35.38	1.457	12 22 39.1	8.05	3 51.0
28	13 59 43.44	0.820	11 2 11.4	5.10	5 35.2	28	14 14 10.58	1.475	12 25 53.1	8.12	3 47.6
29	14 0 3.40	0.844	11 4 15.2	5.22	5 31.6	29	14 14 46.20	1.493	12 29 8.7	8.19	3 44.3
30	14 0 23.95	0.868	11 6 22.0	5.34	5 28.0	30	14 15 22.24	1.511	12 32 26.0	8.26	3 41.0
31	14 0 45.07	+0.892	-11 8 31.7	-5.46	5 24.4	31	14 15 58.70	+1.528	-12 35 44.9	-8.33	3 37.7
32	14 1 6.77	+0.916	-11 10 44.2	-5.58	5 20.8	32	14 16 35.58	+1.545	-12 39 5.4	-8.39	3 34.4
Day of the Month.						Day of the Month.					
6th.						7th.					
14th.						15th.					
22d.						23d.					
30th.						31st.					
Semidiameter . . . .						Semidiameter . . . .					
Horizontal Parallax . .						Horizontal Parallax . .					
18.7 18.2 17.8 17.4						17.0 16.7 16.3 16.0					
1.8 1.7 1.7 1.6						1.6 1.6 1.5 1.5					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.																
SEPTEMBER.						OCTOBER.										
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.					
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.						
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m					
1	14 16 35.58	+1.545	-12 39 5.4	-8.39	3 34.4	1	14 37 48.03	+1.958	-14 28 3.4	-9.53	1 57.5					
2	14 17 12.87	1.562	12 42 27.4	8.45	3 31.1	2	14 38 35.16	1.969	14 31 52.3	9.55	1 54.4					
3	14 17 50.56	1.579	12 45 50.9	8.51	3 27.8	3	14 39 22.55	1.980	14 35 41.6	9.56	1 51.2					
4	14 18 28.65	1.595	12 49 15.9	8.57	3 24.5	4	14 40 10.19	1.990	14 39 31.1	9.57	1 48.1					
5	14 19 7.14	1.611	12 52 42.3	8.63	3 21.2	5	14 40 58.07	2.000	14 43 20.8	9.58	1 44.9					
6	14 19 46.01	+1.627	-12 56 10.0	-8.69	3 17.9	6	14 41 46.19	+2.010	-14 47 10.7	-9.58	1 41.8					
7	14 20 25.26	1.643	12 59 39.0	8.74	3 14.6	7	14 42 34.55	2.020	14 51 0.8	9.59	1 38.6					
8	14 21 4.89	1.659	13 3 9.3	8.79	3 11.3	8	14 43 23.13	2.029	14 54 51.0	9.59	1 35.5					
9	14 21 44.89	1.674	13 6 40.9	8.84	3 8.0	9	14 44 11.94	2.038	14 58 41.3	9.60	1 32.4					
10	14 22 25.25	1.689	13 10 13.6	8.89	3 4.8	10	14 45 0.97	2.047	15 2 31.7	9.60	1 29.3					
11	14 23 5.98	+1.704	-13 13 47.4	-8.94	3 1.5	11	14 45 50.20	+2.056	-15 6 22.1	-9.60	1 26.2					
12	14 23 47.06	1.719	13 17 22.4	8.98	2 58.3	12	14 46 39.64	2.064	15 10 12.4	9.59	1 23.1					
13	14 24 28.48	1.733	13 20 58.4	9.02	2 55.0	13	14 47 29.28	2.072	15 14 2.6	9.59	1 20.0					
14	14 25 10.24	1.747	13 24 35.4	9.06	2 51.8	14	14 48 19.12	2.080	15 17 52.8	9.58	1 16.9					
15	14 25 52.34	1.761	13 28 13.4	9.10	2 48.5	15	14 49 9.15	2.088	15 21 42.9	9.58	1 13.8					
16	14 26 34.79	+1.775	-13 31 52.3	-9.14	2 45.3	16	14 49 59.36	+2.096	-15 25 32.8	-9.57	1 10.7					
17	14 27 17.55	1.789	13 35 32.2	9.18	2 42.1	17	14 50 49.76	2.104	15 29 22.5	9.56	1 7.6					
18	14 28 0.63	1.802	13 39 12.9	9.21	2 38.9	18	14 51 40.34	2.112	15 33 12.1	9.56	1 4.5					
19	14 28 44.03	1.815	13 42 54.4	9.24	2 35.7	19	14 52 31.09	2.118	15 37 1.4	9.55	1 1.4					
20	14 29 27.75	1.828	13 46 36.6	9.28	2 32.5	20	14 53 22.01	2.125	15 40 50.4	9.54	0 58.3					
21	14 30 11.77	+1.840	-13 50 19.6	-9.31	2 29.3	21	14 54 13.09	+2.132	-15 44 39.1	-9.53	0 55.2					
22	14 30 56.09	1.853	13 54 3.4	9.34	2 26.1	22	14 55 4.33	2.138	15 48 27.4	9.51	0 52.2					
23	14 31 40.71	1.866	13 57 47.8	9.37	2 22.9	23	14 55 55.74	2.145	15 52 15.4	9.50	0 49.1					
24	14 32 25.64	1.878	14 1 32.9	9.39	2 19.7	24	14 56 47.30	2.151	15 56 3.0	9.48	0 46.0					
25	14 33 10.86	1.890	14 5 18.6	9.41	2 16.5	25	14 57 39.00	2.157	15 59 50.1	9.46	0 42.9					
26	14 33 56.36	+1.902	-14 9 4.8	-9.44	2 13.3	26	14 58 30.84	+2.163	-16 3 36.8	-9.44	0 39.9					
27	14 34 42.14	1.914	14 12 51.6	9.46	2 10.1	27	14 59 22.83	2.169	16 7 23.0	9.43	0 36.8					
28	14 35 28.20	1.925	14 16 38.9	9.48	2 7.0	28	15 0 14.95	2.174	16 11 8.7	9.39	0 33.7					
29	14 36 14.55	1.936	14 20 26.7	9.50	2 3.8	29	15 1 7.20	2.180	16 14 53.9	9.37	0 30.6					
30	14 37 1.16	1.947	14 24 14.9	9.52	2 0.7	30	15 1 59.57	2.185	16 18 38.5	9.34	0 27.6					
31	14 37 48.03	+1.958	-14 28 3.4	-9.53	1 57.5	31	15 2 52.07	+2.190	-16 22 22.5	-9.32	0 24.5					
32	14 38 35.16	+1.969	-14 31 52.3	-9.55	1 54.4	32	15 3 44.68	+2.195	-16 26 5.9	-9.30	0 21.5					
Day of the Month.					8th.	16th.	24th.	Day of the Month.					2d.	10th.	18th.	26th.
Semidiameter . . . . .					15.8	15.5	15.3	Semidiameter . . . . .					15.2	15.0	14.9	14.8
Horizontal Parallax . . . . .					1.5	1.5	1.4	Horizontal Parallax . . . . .					1.4	1.4	1.4	1.4
NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.																

## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.																		
NOVEMBER.						DECEMBER.												
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.							
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.								
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m							
1	15 3 44.68	+2.195	-16 26 5.9	-9.30	0 21.5	1	15 30 28.40	+2.228	-18 10 36.3	-7.98	22 47.1							
2	15 4 37.39	2.199	16 29 48.6	9.27	0 18.4	2	15 31 21.84	2.225	18 13 47.2	7.92	22 44.0							
3	15 5 30.21	2.203	16 33 30.6	9.24	0 15.4	3	15 32 15.21	2.222	18 16 56.7	7.86	22 41.0							
4	15 6 23.12	2.207	16 37 11.9	9.21	0 12.3	4	15 33 8.50	2.219	18 20 4.7	7.80	22 37.9							
5	15 7 16.12	2.211	16 40 52.4	9.18	0 9.3	5	15 34 1.73	2.216	18 23 11.3	7.74	22 34.9							
6	15 8 9.21	+2.214	-16 44 32.1	-9.14	0 6.2	6	15 34 54.88	+2.212	-18 26 16.4	-7.68	22 31.8							
7	15 9 2.38	2.217	16 48 11.0	9.11	0 3.2	7	15 35 47.93	2.208	18 29 20.0	7.62	22 28.8							
8	15 9 55.62	2.220	16 51 49.0	9.07	0 0.1	8	15 36 40.88	2.204	18 32 22.1	7.56	22 25.7							
9	15 10 48.92	2.222	16 55 26.2	9.03	23 54.1	9	15 37 33.73	2.200	18 35 22.8	7.50	22 22.7							
10	15 11 42.29	2.225	16 59 2.5	8.99	23 51.0	10	15 38 26.48	2.195	18 38 21.9	7.44	22 19.6							
11	15 12 35.72	+2.227	-17 2 37.9	-8.95	23 48.0	11	15 39 19.11	+2.190	-18 41 19.5	-7.37	22 16.6							
12	15 13 29.20	2.229	17 6 12.3	8.91	23 44.9	12	15 40 11.61	2.185	18 44 15.6	7.30	22 13.5							
13	15 14 22.72	2.231	17 9 45.7	8.87	23 41.9	13	15 41 3.98	2.180	18 47 10.1	7.24	22 10.5							
14	15 15 16.28	2.233	17 13 18.1	8.83	23 38.8	14	15 41 56.22	2.174	18 50 3.0	7.17	22 7.4							
15	15 16 9.88	2.234	17 16 49.6	8.79	23 35.8	15	15 42 48.32	2.168	18 52 54.3	7.10	22 4.3							
16	15 17 3.52	+2.235	-17 20 20.1	-8.75	23 32.7	16	15 43 40.28	+2.162	-18 55 44.0	-7.04	22 1.2							
17	15 17 57.18	2.236	17 23 49.4	8.70	23 29.7	17	15 44 32.11	2.156	18 58 32.1	6.97	21 58.2							
18	15 18 50.86	2.237	17 27 17.6	8.65	23 26.6	18	15 45 23.78	2.149	19 1 18.5	6.90	21 55.1							
19	15 19 44.55	2.237	17 30 44.7	8.61	23 23.6	19	15 46 15.28	2.142	19 4 3.3	6.84	21 52.0							
20	15 20 38.26	2.238	17 34 10.7	8.56	23 20.5	20	15 47 6.61	2.135	19 6 46.5	6.77	21 48.9							
21	15 21 31.98	+2.238	-17 37 35.6	-8.51	23 17.5	21	15 47 57.76	+2.128	-19 9 28.2	-6.70	21 45.8							
22	15 22 25.70	2.238	17 40 59.3	8.46	23 14.4	22	15 48 48.73	2.120	19 12 8.1	6.63	21 42.7							
23	15 23 19.41	2.238	17 44 21.8	8.41	23 11.4	23	15 49 39.52	2.112	19 14 46.3	6.56	21 39.6							
24	15 24 13.13	2.238	17 47 43.0	8.36	23 8.4	24	15 50 30.12	2.104	19 17 22.8	6.49	21 36.5							
25	15 25 6.83	2.237	17 51 3.0	8.31	23 5.3	25	15 51 20.53	2.095	19 19 57.7	6.42	21 33.4							
26	15 26 0.50	+2.236	-17 54 21.9	-8.26	23 2.3	26	15 52 10.72	+2.086	-19 22 30.8	-6.35	21 30.3							
27	15 26 54.15	2.235	17 57 39.5	8.20	22 59.3	27	15 53 0.69	2.077	19 25 2.2	6.27	21 27.2							
28	15 27 47.77	2.234	18 0 55.8	8.15	22 56.2	28	15 53 50.44	2.068	19 27 31.9	6.20	21 24.1							
29	15 28 41.36	2.232	18 4 10.7	8.09	22 53.2	29	15 54 39.98	2.058	19 29 59.9	6.13	21 21.0							
30	15 29 34.90	2.230	18 7 24.2	8.03	22 50.1	30	15 55 29.27	2.048	19 32 26.2	6.06	21 17.9							
31	15 30 28.40	+2.228	-18 10 36.3	-7.98	22 47.1	31	15 56 18.31	+2.038	-19 34 50.7	-5.99	21 14.8							
32	15 31 21.84	+2.225	-18 13 47.2	-7.93	22 44.0	32	15 57 7.09	+2.028	-19 37 13.4	-5.91	21 11.6							
Day of the Month.					8d.	11th.	19th.	27th.	Day of the Month.					8th.	13th.	21st.	29th.	27th.
Semidiameter . . . .					14.8	14.8	14.8	14.8	Semidiameter . . . .					14.9	15.0	15.2	15.4	15.6
Horizontal Parallax . .					1.4	1.4	1.4	1.4	Horizontal Parallax . .					1.4	1.4	1.4	1.4	1.5

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m						
1	17 7 12.62	+1.198	-21 30 25.1	-1.54	22 20.3	1	17 20 40.64	+0.942	-21 44 47.0	-0.79	20 31.7						
2	17 7 41.31	1.193	21 31 1.9	1.52	22 16.8	2	17 21 3.09	0.930	21 45 5.6	0.76	20 28.2						
3	17 8 9.89	1.188	21 31 38.1	1.49	22 13.4	3	17 21 25.27	0.918	21 45 23.6	0.74	20 24.6						
4	17 8 38.33	1.183	21 32 13.7	1.47	22 9.9	4	17 21 47.17	0.906	21 45 41.0	0.71	20 21.1						
5	17 9 6.63	1.177	21 32 48.7	1.44	22 6.5	5	17 22 8.78	0.894	21 45 57.9	0.69	20 17.5						
6	17 9 34.79	+1.171	-21 33 23.0	-1.42	22 3.0	6	17 22 30.10	+0.882	-21 46 14.3	-0.67	20 13.9						
7	17 10 2.82	1.165	21 33 56.7	1.39	21 59.6	7	17 22 51.12	0.870	21 46 30.2	0.65	20 10.3						
8	17 10 30.69	1.158	21 34 29.8	1.37	21 56.1	8	17 23 11.84	0.857	21 46 45.6	0.63	20 6.7						
9	17 10 58.40	1.151	21 35 2.3	1.34	21 52.6	9	17 23 32.26	0.844	21 47 0.5	0.61	20 3.1						
10	17 11 25.94	1.144	21 35 34.2	1.32	21 49.1	10	17 23 52.37	0.831	21 47 14.8	0.59	19 59.5						
11	17 11 53.32	+1.137	-21 36 5.6	-1.29	21 45.7	11	17 24 12.16	+0.818	-21 47 28.6	-0.57	19 55.9						
12	17 12 20.52	1.130	21 36 36.3	1.27	21 42.2	12	17 24 31.63	0.805	21 47 41.9	0.55	19 52.3						
13	17 12 47.54	1.122	21 37 6.4	1.24	21 38.7	13	17 24 50.78	0.791	21 47 54.7	0.53	19 48.7						
14	17 13 14.39	1.114	21 37 35.9	1.22	21 35.2	14	17 25 9.60	0.777	21 48 7.0	0.51	19 45.1						
15	17 13 41.05	1.106	21 38 4.9	1.19	21 31.7	15	17 25 28.09	0.763	21 48 18.8	0.49	19 41.4						
16	17 14 7.51	+1.098	-21 38 33.2	-1.17	21 28.2	16	17 25 46.24	+0.749	-21 48 30.2	-0.47	19 37.8						
17	17 14 33.77	1.090	21 39 0.9	1.15	21 24.7	17	17 26 4.05	0.735	21 48 41.1	0.45	19 34.1						
18	17 14 59.82	1.081	21 39 28.0	1.12	21 21.2	18	17 26 21.52	0.720	21 48 51.5	0.43	19 30.5						
19	17 15 25.67	1.072	21 39 54.6	1.10	21 17.7	19	17 26 38.64	0.705	21 49 1.5	0.41	19 26.8						
20	17 15 51.30	1.063	21 40 20.6	1.07	21 14.2	20	17 26 55.42	0.690	21 49 11.0	0.40	19 23.2						
21	17 16 16.71	+1.054	-21 40 46.0	-1.05	21 10.7	21	17 27 11.85	+0.676	-21 49 20.0	-0.38	19 19.5						
22	17 16 41.90	1.045	21 41 10.8	1.03	21 7.1	22	17 27 27.92	0.661	21 49 28.6	0.36	19 15.8						
23	17 17 6.87	1.036	21 41 34.9	1.00	21 3.6	23	17 27 43.63	0.646	21 49 36.8	0.34	19 12.1						
24	17 17 31.61	1.027	21 41 58.5	0.98	21 0.1	24	17 27 58.97	0.631	21 49 44.5	0.32	19 8.5						
25	17 17 56.11	1.017	21 42 21.5	0.95	20 56.6	25	17 28 13.95	0.616	21 49 51.8	0.30	19 4.8						
26	17 18 20.37	+1.007	-21 42 44.0	-0.93	20 53.0	26	17 28 28.56	+0.601	-21 49 58.7	-0.28	19 1.1						
27	17 18 44.38	0.997	21 43 5.9	0.91	20 49.5	27	17 28 42.80	0.586	21 50 5.1	0.26	18 57.4						
28	17 19 8.15	0.986	21 43 27.2	0.88	20 45.9	28	17 28 56.67	0.570	21 50 11.1	0.24	18 53.7						
29	17 19 31.66	0.975	21 43 48.0	0.86	20 42.4	29	17 29 10.15	0.554	21 50 16.8	0.22	18 50.0						
30	17 19 54.91	0.964	21 44 8.2	0.83	20 38.8	30	17 29 23.25	0.538	21 50 22.1	0.21	18 46.3						
31	17 20 17.91	+0.953	-21 44 27.9	-0.81	20 35.3	31	17 29 35.98	+0.522	-21 50 27.0	-0.19	18 42.5						
32	17 20 40.64	+0.942	-21 44 47.0	-0.79	20 31.7	32	17 29 48.32	+0.506	-21 50 31.4	-0.18	18 38.8						
Day of the Month.					8d.	11th.	19th.	27th.	Day of the Month.					4th.	12th.	20th.	28th.
Semidiameter . . . .					7.2	7.2	7.2	7.3	Semidiameter . . . .					7.4	7.5	7.6	7.6
Horizontal Parallax . .					0.8	0.8	0.8	0.8	Horizontal Parallax . .					0.8	0.8	0.9	0.9

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	17 29 10.15	+0.554	-21 50 16.8	-0.22	18 50.0	1	17 32 46.56	+0.018	-21 50 21.1	+0.18	16 51.5
2	17 29 23.25	0.538	21 50 22.1	0.21	18 46.3	2	17 32 46.79	0.000	21 50 16.6	0.19	16 47.6
3	17 29 35.98	0.522	21 50 27.0	0.19	18 42.5	3	17 32 46.59	-0.018	21 50 11.8	0.20	16 43.6
4	17 29 48.32	0.506	21 50 31.4	0.18	18 38.8	4	17 32 45.96	0.036	21 50 6.8	0.21	16 39.7
5	17 30 0.27	0.490	21 50 35.5	0.16	18 35.0	5	17 32 44.89	0.053	21 50 1.6	0.22	16 35.7
6	17 30 11.82	+0.473	-21 50 39.2	-0.15	18 31.3	6	17 32 43.40	-0.071	-21 49 56.1	+0.23	16 31.8
7	17 30 22.97	0.456	21 50 42.5	0.13	18 27.5	7	17 32 41.49	0.089	21 49 50.4	0.24	16 27.8
8	17 30 33.72	0.439	21 50 45.5	0.12	18 23.8	8	17 32 39.16	0.107	21 49 44.4	0.25	16 23.8
9	17 30 44.07	0.422	21 50 48.1	0.10	18 20.0	9	17 32 36.40	0.124	21 49 38.2	0.26	16 19.8
10	17 30 54.01	0.405	21 50 50.3	0.09	18 16.3	10	17 32 33.22	0.142	21 49 31.7	0.27	16 15.8
11	17 31 3.54	+0.388	-21 50 52.2	-0.07	18 12.5	11	17 32 29.62	-0.159	-21 49 25.1	+0.28	16 11.8
12	17 31 12.65	0.371	21 50 53.8	0.06	18 8.7	12	17 32 25.60	0.176	21 49 18.3	0.29	16 7.8
13	17 31 21.36	0.354	21 50 55.0	0.05	18 4.9	13	17 32 21.16	0.193	21 49 11.3	0.30	16 3.8
14	17 31 29.65	0.337	21 50 55.9	0.03	18 1.1	14	17 32 16.31	0.210	21 49 4.1	0.31	15 59.8
15	17 31 37.52	0.319	21 50 56.5	-0.02	17 57.3	15	17 32 11.06	0.227	21 48 56.7	0.31	15 55.8
16	17 31 44.96	+0.302	-21 50 56.8	0.00	17 53.5	16	17 32 5.40	-0.244	-21 48 49.0	+0.32	15 51.8
17	17 31 51.99	0.284	21 50 56.8	+0.01	17 49.6	17	17 31 59.34	0.261	21 48 41.1	0.33	15 47.7
18	17 31 58.60	0.267	21 50 56.4	0.02	17 45.8	18	17 31 52.88	0.277	21 48 33.0	0.34	15 43.7
19	17 32 4.79	0.249	21 50 55.7	0.04	17 42.0	19	17 31 46.03	0.294	21 48 24.7	0.35	15 39.6
20	17 32 10.55	0.232	21 50 54.7	0.05	17 38.1	20	17 31 38.79	0.310	21 48 16.2	0.36	15 35.6
21	17 32 15.89	+0.214	-21 50 53.5	+0.06	17 34.3	21	17 31 31.15	-0.326	-21 48 7.5	+0.37	15 31.5
22	17 32 20.81	0.196	21 50 52.0	0.07	17 30.4	22	17 31 23.13	0.342	21 47 58.6	0.38	15 27.4
23	17 32 25.30	0.179	21 50 50.1	0.08	17 26.6	23	17 31 14.74	0.358	21 47 49.5	0.39	15 23.4
24	17 32 29.37	0.161	21 50 47.9	0.10	17 22.7	24	17 31 5.97	0.373	21 47 40.3	0.40	15 19.3
25	17 32 33.01	0.143	21 50 45.5	0.11	17 18.8	25	17 30 56.83	0.389	21 47 30.9	0.40	15 15.2
26	17 32 36.22	+0.125	-21 50 42.8	+0.12	17 14.9	26	17 30 47.32	-0.404	-21 47 21.2	+0.41	15 11.1
27	17 32 39.01	0.107	21 50 39.8	0.13	17 11.1	27	17 30 37.45	0.419	21 47 11.4	0.42	15 7.0
28	17 32 41.38	0.089	21 50 36.6	0.14	17 7.2	28	17 30 27.22	0.434	21 47 1.4	0.42	15 2.9
29	17 32 43.32	0.071	21 50 33.1	0.15	17 3.3	29	17 30 16.63	0.449	21 46 51.2	0.43	14 58.8
30	17 32 44.83	0.054	21 50 29.4	0.16	16 59.4	30	17 30 5.69	0.463	21 46 40.8	0.44	14 54.7
31	17 32 45.91	+0.036	-21 50 25.4	+0.17	16 55.4	31	17 29 54.41	-0.477	-21 46 30.2	+0.44	14 50.6
32	17 32 46.56	+0.018	-21 50 21.1	+0.18	16 51.5	32	17 29 42.79	-0.491	-21 46 19.5	+0.45	14 46.4

Day of the Month.	8th.	16th.	24th.	Day of the Month.	1st.	9th.	17th.	25th.
Semidiameter . . . . .	7.7	7.8	7.9	Semidiameter . . . . .	8.1	8.2	8.3	8.4
Horizontal Parallax . . . . .	0.9	0.9	0.9	Horizontal Parallax . . . . .	0.9	0.9	0.9	0.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m						
1	17 29 54.41	-0.477	-21 46 30.2	+0.44	14 50.6	1	17 21 50.10	-0.772	-21 39 49.8	+0.60	12 40.6						
2	17 29 42.79	0.491	21 46 19.5	0.45	14 46.4	2	17 21 31.53	0.776	21 39 35.2	0.60	12 36.3						
3	17 29 30.84	0.505	21 46 8.6	0.46	14 42.3	3	17 21 12.87	0.779	21 39 20.6	0.60	12 32.1						
4	17 29 18.55	0.519	21 45 57.5	0.47	14 38.1	4	17 20 54.12	0.782	21 39 6.0	0.61	12 27.8						
5	17 29 5.94	0.532	21 45 46.2	0.47	14 34.0	5	17 20 35.30	0.785	21 38 51.4	0.61	12 23.6						
6	17 28 53.02	-0.545	-21 45 34.8	+0.48	14 29.9	6	17 20 16.43	-0.787	-21 38 36.7	+0.61	12 19.4						
7	17 28 39.78	0.558	21 45 23.2	0.49	14 25.7	7	17 19 57.51	0.789	21 38 22.0	0.61	12 15.1						
8	17 28 26.23	0.570	21 45 11.4	0.49	14 21.5	8	17 19 38.53	0.790	21 38 7.3	0.61	12 10.9						
9	17 28 12.39	0.582	21 44 59.5	0.50	14 17.4	9	17 19 19.52	0.791	21 37 52.6	0.61	12 6.6						
10	17 27 58.26	0.594	21 44 47.5	0.50	14 13.2	10	17 19 0.50	0.792	21 37 37.9	0.61	12 2.4						
11	17 27 43.85	-0.606	-21 44 35.3	+0.51	14 9.0	11	17 18 41.48	-0.792	-21 37 23.3	+0.61	11 58.1						
12	17 27 29.16	0.617	21 44 22.9	0.51	14 4.9	12	17 18 22.45	0.792	21 37 8.7	0.61	11 53.9						
13	17 27 14.21	0.628	21 44 10.4	0.52	14 0.7	13	17 18 3.43	0.791	21 36 54.1	0.61	11 49.6						
14	17 26 58.99	0.639	21 43 57.7	0.52	13 56.5	14	17 17 44.44	0.791	21 36 39.6	0.60	11 45.4						
15	17 26 43.52	0.649	21 43 44.9	0.53	13 52.3	15	17 17 25.47	0.790	21 36 25.2	0.60	11 41.1						
16	17 26 27.81	-0.659	-21 43 32.0	+0.54	13 48.1	16	17 17 6.54	-0.788	-21 36 10.8	+0.60	11 36.9						
17	17 26 11.87	0.668	21 43 18.9	0.55	13 43.9	17	17 16 47.65	0.786	21 35 56.5	0.59	11 32.7						
18	17 25 55.70	0.677	21 43 5.7	0.55	13 39.7	18	17 16 28.83	0.783	21 35 42.3	0.59	11 28.4						
19	17 25 39.30	0.686	21 42 52.4	0.56	13 35.5	19	17 16 10.08	0.780	21 35 28.1	0.59	11 24.2						
20	17 25 22.69	0.695	21 42 38.9	0.56	13 31.3	20	17 15 51.41	0.776	21 35 14.0	0.58	11 19.9						
21	17 25 5.89	-0.704	-21 42 25.3	+0.57	13 27.1	21	17 15 32.82	-0.772	-21 35 0.1	+0.58	11 15.7						
22	17 24 48.90	0.712	21 42 11.6	0.57	13 22.9	22	17 15 14.33	0.768	21 34 46.3	0.57	11 11.4						
23	17 24 31.72	0.720	21 41 57.9	0.58	13 18.6	23	17 14 55.94	0.764	21 34 32.7	0.57	11 7.2						
24	17 24 14.36	0.727	21 41 44.1	0.58	13 14.4	24	17 14 37.65	0.759	21 34 19.3	0.56	11 3.0						
25	17 23 56.84	0.734	21 41 30.1	0.59	13 10.2	25	17 14 19.48	0.754	21 34 6.0	0.55	10 58.8						
26	17 23 39.15	-0.740	-21 41 16.0	+0.59	13 6.0	26	17 14 1.45	-0.748	-21 33 52.9	+0.55	10 54.5						
27	17 23 21.30	0.746	21 41 1.8	0.59	13 1.7	27	17 13 43.56	0.744	21 33 40.0	0.54	10 50.3						
28	17 23 3.31	0.752	21 40 47.5	0.60	12 57.5	28	17 13 25.81	0.736	21 33 27.2	0.53	10 46.1						
29	17 22 45.19	0.758	21 40 33.2	0.60	12 53.3	29	17 13 8.21	0.730	21 33 14.6	0.52	10 41.8						
30	17 22 26.95	0.765	21 40 18.8	0.60	12 49.1	30	17 12 50.78	0.723	21 33 2.3	0.51	10 37.6						
31	17 22 8.58	-0.768	-21 40 4.3	+0.60	12 44.8	31	17 12 33.53	-0.715	-21 32 50.3	+0.50	10 33.4						
32	17 21 50.10	-0.772	-21 39 49.8	+0.60	12 40.6	32	17 12 16.45	-0.707	-21 32 38.5	+0.49	10 29.2						
Day of the Month.					3d.	11th.	19th.	27th.	Day of the Month.					4th.	12th.	20th.	28th.
Semidiameter . . . . .					8.4	8.5	8.6	8.6	Semidiameter . . . . .					8.6	8.6	8.6	8.6
Horizontal Parallax . . .					1.0	1.0	1.0	1.0	Horizontal Parallax . . .					1.0	1.0	1.0	1.0

Note.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.																	
JULY.						AUGUST.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m						
1	17 12 33.53	-0.715	-21 32 50.3	+0.50	10 33.4	1	17 5 45.69	-0.340	-21 29 29.7	-0.01	8 24.8						
2	17 12 16.45	-0.707	21 32 38.5	0.49	10 29.2	2	17 5 37.71	0.325	21 29 30.5	0.04	8 20.8						
3	17 11 59.55	-0.699	21 32 26.9	0.48	10 25.0	3	17 5 30.10	0.309	21 29 31.8	0.06	8 16.7						
4	17 11 42.86	-0.691	21 32 15.6	0.47	10 20.8	4	17 5 22.88	0.293	21 29 33.7	0.09	8 12.6						
5	17 11 26.38	-0.682	21 32 4.6	0.45	10 16.6	5	17 5 16.05	0.277	21 29 36.1	0.11	8 8.6						
6	17 11 10.11	-0.673	-21 31 53.9	+0.44	10 12.4	6	17 5 9.60	-0.261	-21 29 39.0	-0.13	8 4.6						
7	17 10 54.06	-0.664	21 31 43.5	0.43	10 8.2	7	17 5 3.54	0.245	21 29 42.5	0.16	8 0.5						
8	17 10 38.25	-0.654	21 31 33.4	0.42	10 4.0	8	17 4 57.88	0.228	21 29 46.6	0.18	7 56.5						
9	17 10 22.68	-0.644	21 31 23.6	0.41	9 59.8	9	17 4 52.62	0.211	21 29 51.2	0.20	7 52.5						
10	17 10 7.35	-0.633	21 31 14.1	0.39	9 55.6	10	17 4 47.76	0.195	21 29 56.3	0.22	7 48.5						
11	17 9 52.28	-0.622	-21 31 4.9	+0.38	9 51.4	11	17 4 43.30	-0.178	-21 30 2.0	-0.25	7 44.5						
12	17 9 37.48	-0.611	21 30 56.1	0.36	9 47.3	12	17 4 39.25	0.161	21 30 8.3	0.27	7 40.5						
13	17 9 22.94	-0.600	21 30 47.7	0.35	9 43.1	13	17 4 35.61	0.144	21 30 15.1	0.30	7 36.5						
14	17 9 8.67	-0.589	21 30 39.8	0.33	9 38.9	14	17 4 32.37	0.127	21 30 22.5	0.32	7 32.5						
15	17 8 54.68	-0.577	21 30 32.2	0.31	9 34.7	15	17 4 29.53	0.110	21 30 30.5	0.35	7 28.5						
16	17 8 40.99	-0.565	-21 30 25.0	+0.30	9 30.6	16	17 4 27.11	-0.093	-21 30 39.1	-0.37	7 24.6						
17	17 8 27.60	-0.552	21 30 18.2	0.28	9 26.4	17	17 4 25.10	0.075	21 30 48.2	0.40	7 20.6						
18	17 8 14.51	-0.539	21 30 11.7	0.26	9 22.3	18	17 4 23.50	0.058	21 30 57.8	0.42	7 16.7						
19	17 8 1.72	-0.526	21 30 5.7	0.24	9 18.2	19	17 4 22.30	0.041	21 31 8.0	0.44	7 12.7						
20	17 7 49.24	-0.513	21 30 0.1	0.22	9 14.0	20	17 4 21.52	0.024	21 31 18.8	0.46	7 8.8						
21	17 7 37.09	-0.500	-21 29 54.9	+0.21	9 9.9	21	17 4 21.15	-0.007	-21 31 30.2	-0.48	7 4.8						
22	17 7 25.26	-0.487	21 29 50.2	0.19	9 5.8	22	17 4 21.20	+0.011	21 31 42.1	0.51	7 0.9						
23	17 7 13.75	-0.473	21 29 46.0	0.17	9 1.6	23	17 4 21.66	0.028	21 31 54.6	0.53	6 57.0						
24	17 7 2.58	-0.459	21 29 42.2	0.15	8 57.5	24	17 4 22.53	0.045	21 32 7.6	0.55	6 53.1						
25	17 6 51.74	-0.445	21 29 38.9	0.13	8 53.4	25	17 4 23.82	0.065	21 32 21.2	0.57	6 49.2						
26	17 6 41.24	-0.431	-21 29 36.1	+0.11	8 49.3	26	17 4 25.52	+0.080	-21 32 35.3	-0.60	6 45.3						
27	17 6 31.09	-0.417	21 29 33.8	0.09	8 45.2	27	17 4 27.64	0.097	21 32 50.0	0.62	6 41.4						
28	17 6 21.29	-0.402	21 29 32.0	0.07	8 41.1	28	17 4 30.18	0.114	21 33 5.3	0.65	6 37.5						
29	17 6 11.85	-0.387	21 29 30.7	0.05	8 37.0	29	17 4 33.13	0.131	21 33 21.1	0.67	6 33.6						
30	17 6 2.76	-0.371	21 29 29.8	0.03	8 32.9	30	17 4 36.49	0.149	21 33 37.4	0.69	6 29.7						
31	17 5 54.04	-0.356	-21 29 29.5	+0.01	8 28.9	31	17 4 40.27	+0.166	-21 33 54.3	-0.72	6 25.8						
32	17 5 45.69	-0.340	-21 29 29.7	-0.01	8 24.8	32	17 4 44.47	+0.183	-21 34 11.7	-0.74	6 22.0						
Day of the Month.					6th.	14th.	22d.	30th.	Day of the Month.					7th.	15th.	23d.	31st.
Semidiameter . . . . .					8.6	8.5	8.4	8.3	Semidiameter . . . . .					8.2	8.1	8.0	7.9
Horizontal Parallax . . . . .					1.0	1.0	1.0	0.9	Horizontal Parallax . . . . .					0.9	0.9	0.9	0.9
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.																	

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.



GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	17 4 44.47	+0.183	-21 34 11.7	-0.74	6 22.0	1	17 9 56.35	+0.669	-21 46 24.1	-1.24	4 29.2
2	17 4 49.08	0.200	21 34 29.6	0.76	6 18.1	2	17 10 12.58	0.684	21 46 53.9	1.23	4 25.6
3	17 4 54.11	0.218	21 34 48.1	0.78	6 14.3	3	17 10 29.16	0.698	21 47 24.0	1.26	4 21.9
4	17 4 59.55	0.235	21 35 7.1	0.80	6 10.4	4	17 10 46.08	0.712	21 47 54.3	1.27	4 18.3
5	17 5 5.41	0.252	21 35 26.6	0.82	6 6.6	5	17 11 3.34	0.726	21 48 24.8	1.28	4 14.6
6	17 5 11.68	+0.269	-21 35 46.6	-0.84	6 2.8	6	17 11 20.94	+0.740	-21 48 55.6	-1.29	4 11.0
7	17 5 18.36	0.286	21 36 7.1	0.86	5 59.0	7	17 11 38.88	0.754	21 49 26.6	1.29	4 7.3
8	17 5 25.44	0.304	21 36 28.0	0.88	5 55.1	8	17 11 57.14	0.767	21 49 57.8	1.30	4 3.7
9	17 5 32.94	0.321	21 36 49.4	0.90	5 51.3	9	17 12 15.73	0.781	21 50 29.1	1.30	4 0.1
10	17 5 40.84	0.338	21 37 11.3	0.92	5 47.5	10	17 12 34.65	0.794	21 51 0.6	1.31	3 56.5
11	17 5 49.14	+0.355	-21 37 33.7	-0.94	5 43.8	11	17 12 53.89	+0.807	-21 51 32.2	-1.31	3 52.9
12	17 5 57.85	0.372	21 37 56.5	0.96	5 40.0	12	17 13 13.44	0.820	21 52 3.9	1.32	3 49.3
13	17 6 6.96	0.388	21 38 19.8	0.98	5 36.2	13	17 13 33.29	0.833	21 52 35.7	1.33	3 45.7
14	17 6 16.46	0.405	21 38 43.5	1.00	5 32.4	14	17 13 53.45	0.846	21 53 7.7	1.33	3 42.1
15	17 6 26.36	0.421	21 39 7.7	1.01	5 28.6	15	17 14 13.92	0.859	21 53 39.7	1.33	3 38.5
16	17 6 36.65	+0.437	-21 39 32.2	-1.03	5 24.9	16	17 14 34.68	+0.871	-21 54 11.8	-1.34	3 34.9
17	17 6 47.34	0.453	21 39 57.2	1.04	5 21.2	17	17 14 55.73	0.883	21 54 44.0	1.34	3 31.3
18	17 6 58.41	0.469	21 40 22.6	1.06	5 17.4	18	17 15 17.07	0.895	21 55 16.2	1.34	3 27.7
19	17 7 9.86	0.485	21 40 48.3	1.08	5 13.6	19	17 15 38.70	0.907	21 55 48.5	1.34	3 24.1
20	17 7 21.68	0.501	21 41 14.4	1.09	5 9.9	20	17 16 0.61	0.919	21 56 20.8	1.35	3 20.6
21	17 7 33.89	+0.517	-21 41 40.9	-1.11	5 6.1	21	17 16 22.80	+0.931	-21 56 53.1	-1.35	3 17.0
22	17 7 46.48	0.533	21 42 7.7	1.12	5 2.4	22	17 16 45.26	0.944	21 57 25.4	1.35	3 13.5
23	17 7 59.44	0.548	21 42 34.9	1.14	4 58.7	23	17 17 8.00	0.953	21 57 57.7	1.35	3 9.9
24	17 8 12.78	0.564	21 43 2.5	1.15	4 55.0	24	17 17 31.00	0.964	21 58 30.0	1.35	3 6.4
25	17 8 26.49	0.579	21 43 30.4	1.17	4 51.3	25	17 17 54.26	0.975	21 59 2.3	1.35	3 2.8
26	17 8 40.56	+0.594	-21 43 58.6	-1.18	4 47.6	26	17 18 17.78	+0.986	-21 59 34.6	-1.35	2 59.3
27	17 8 55.00	0.609	21 44 27.1	1.20	4 43.9	27	17 18 41.56	0.996	22 0 6.8	1.34	2 55

**NOTE.**—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	17 20 44.16	+1.046	-22 2 46.5	-1.38	2 38.1	1	17 34 39.57	+1.245	-22 16 54.1	-0.98	0 54.0	
2	17 21 9.39	1.056	22 3 18.1	1.31	2 34.6	2	17 35 9.49	1.248	22 17 17.4	0.96	0 50.5	
3	17 21 34.85	1.065	22 3 49.6	1.30	2 31.1	3	17 35 39.49	1.251	22 17 40.3	0.94	0 47.1	
4	17 22 0.53	1.074	22 4 20.9	1.29	2 27.6	4	17 36 9.58	1.254	22 18 2.8	0.93	0 43.7	
5	17 22 26.42	1.083	22 4 52.1	1.29	2 24.1	5	17 36 39.74	1.257	22 18 24.8	0.91	0 40.3	
6	17 22 52.52	+1.092	-22 5 23.1	-1.28	2 20.6	6	17 37 9.97	+1.260	-22 18 46.4	-0.90	0 36.8	
7	17 23 18.82	1.100	22 5 53.9	1.28	2 17.1	7	17 37 40.25	1.263	22 19 7.6	0.88	0 33.4	
8	17 23 45.33	1.108	22 6 24.5	1.27	2 13.6	8	17 38 10.58	1.265	22 19 28.4	0.87	0 30.0	
9	17 24 12.03	1.116	22 6 54.9	1.27	2 10.1	9	17 38 40.97	1.267	22 19 48.9	0.85	0 26.6	
10	17 24 38.92	1.124	22 7 25.1	1.26	2 6.6	10	17 39 11.40	1.269	22 20 8.9	0.83	0 23.1	
11	17 25 6.00	+1.132	-22 7 55.1	-1.25	2 3.2	11	17 39 41.87	+1.271	-22 20 28.4	-0.81	0 19.7	
12	17 25 33.26	1.139	22 8 24.9	1.24	1 59.7	12	17 40 12.37	1.272	22 20 47.5	0.79	0 16.3	
13	17 26 0.69	1.146	22 8 54.4	1.23	1 56.2	13	17 40 42.91	1.273	22 21 6.1	0.77	0 12.9	
14	17 26 28.30	1.153	22 9 23.6	1.22	1 52.7	14	17 41 13.47	1.274	22 21 24.3	0.75	0 9.4	
15	17 26 56.08	1.160	22 9 52.6	1.21	1 49.3	15	17 41 44.05	1.275	22 21 42.0	0.73	0 6.0	
16	17 27 24.02	+1.167	-22 10 21.3	-1.20	1 45.8	16	17 42 14.64	+1.276	-22 21 59.2	-0.71	0 2.8	
17	17 27 52.11	1.174	22 10 49.7	1.18	1 42.3	17	17 42 45.25	1.276	22 22 16.0	0.69	23 55.7	
18	17 28 20.36	1.180	22 11 17.9	1.17	1 38.8	18	17 43 15.87	1.276	22 22 32.4	0.67	23 52.3	
19	17 28 48.76	1.186	22 11 45.8	1.15	1 35.4	19	17 43 46.48	1.275	22 22 48.3	0.65	23 48.9	
20	17 29 17.31	1.192	22 12 13.4	1.14	1 31.9	20	17 44 17.09	1.275	22 23 3.7	0.63	23 45.5	
21	17 29 45.99	+1.198	-22 12 40.7	-1.12	1 28.5	21	17 44 47.69	+1.274	-22 23 18.6	-0.61	23 42.0	
22	17 30 14.81	1.204	22 13 7.6	1.11	1 25.0	22	17 45 18.28	1.274	22 23 33.1	0.59	23 38.6	
23	17 30 43.76	1.209	22 13 34.2	1.10	1 21.6	23	17 45 48.85	1.273	22 23 47.1	0.58	23 35.2	
24	17 31 12.84	1.214	22 14 0.4	1.08	1 18.1	24	17 46 19.41	1.272	22 24 0.6	0.56	23 31.8	
25	17 31 42.04	1.219	22 14 26.3	1.07	1 14.7	25	17 46 49.94	1.271	22 24 13.7	0.54	23 28.3	
26	17 32 11.36	+1.224	-22 14 51.9	-1.05	1 11.2	26	17 47 20.43	+1.270	-22 24 26.3	-0.52	23 24.9	
27	17 32 40.80	1.229	22 15 17.1	1.04	1 7.8	27	17 47 50.88	1.268	22 24 38.5	0.50	23 21.5	
28	17 33 10.35	1.233	22 15 41.9	1.02	1 4.3	28	17 48 21.30	1.266	22 24 50.2	0.48	23 18.1	
29	17 33 40.00	1.237	22 16 6.3	1.01	1 0.9	29	17 48 51.67	1.264	22 25 1.4	0.46	23 14.6	
30	17 34 9.74	1.241	22 16 30.4	0.99	0 57.4	30	17 49 21.98	1.262	22 25 12.2	0.44	23 11.2	
31	17 34 39.57	+1.245	-22 16 54.1	-0.98	0 54.0	31	17 49 52.23	+1.259	-22 25 22.5	-0.42	23 7.8	
32	17 35 9.49	+1.248	-22 17 17.4	-0.96	0 50.5	32	17 50 22.42	+1.257	-22 25 32.3	-0.40	23 4.4	
Day of the Month.		8d.	11th.	19th.	27th.	Day of the Month.		8th.	18th.	21st.	29th.	27th.
Semidiameter . . . .		7.2	7.2	7.1	7.1	Semidiameter . . . .		7.1	7.1	7.1	7.1	7.1
Horizontal Parallax . .		0.8	0.8	0.8	0.8	Horizontal Parallax . .		0.8	0.8	0.8	0.8	0.8

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

Day and Month.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Day and Month.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
Jan. 3	h m s	s	° ' "	"	h m	July 2	h m s	s	° ' "	"	h m
7	16 16 48.93	+13.279	21 12 50.0	-32.99	21 21.9	6	16 10 55.33	-7.815	20 59 6.3	+19.46	9 28.1
11	16 17 41.07	12.780	21 14 59.0	31.47	21 7.1	10	16 10 25.24	-7.222	20 57 51.4	18.00	9 11.9
15	16 18 31.11	12.230	21 17 1.7	29.88	20 52.1	14	16 9 57.62	-6.580	20 56 42.5	16.40	8 55.7
19	16 19 18.85	11.632	21 18 57.9	28.21	20 37.2	18	16 9 32.66	-5.893	20 55 40.4	14.66	8 39.5
23	16 20 4.11	10.992	21 20 47.3	26.47	20 22.2	22	16 9 10.52	-5.172	20 54 45.4	12.79	8 23.4
27	16 20 46.74	+10.316	21 22 29.6	-24.67	20 7.2	26	16 8 51.32	-4.422	20 53 58.2	+10.81	8 7.4
31	16 21 26.59	9.604	21 24 4.6	22.82	19 52.1	30	16 8 35.18	-3.644	20 53 19.0	8.78	7 51.4
Feb. 4	16 22 3.53	8.860	21 25 32.1	20.92	19 37.0	Aug. 3	16 8 22.20	-2.842	20 52 48.1	6.66	7 35.5
8	16 22 37.42	8.078	21 26 51.9	18.98	19 21.8	7	16 8 12.48	-2.013	20 52 25.8	4.46	7 19.6
12	16 23 8.11	7.263	21 28 3.9	17.00	19 6.6	11	16 8 6.12	-1.165	20 52 12.5	+2.19	7 3.8
16	16 23 35.49	+6.420	21 29 7.9	-14.98	18 51.3	15	16 8 3.18	-0.303	20 52 8.3	-0.09	6 48.0
20	16 23 59.44	5.555	21 30 3.7	12.93	18 36.0	19	16 8 3.70	+0.564	20 52 13.2	2.39	6 32.3
24	16 24 19.91	4.676	21 30 51.3	10.87	18 20.6	23	16 8 7.69	1.430	20 52 27.4	4.70	6 16.6
28	16 24 36.83	3.783	21 31 30.7	8.81	18 5.1	27	16 8 15.14	2.295	20 52 50.8	6.99	6 1.0
Mar. 4	16 24 50.16	2.882	21 32 1.8	6.75	17 49.6	31	16 8 26.05	3.158	20 53 23.3	9.27	5 45.5
8	16 24 59.87	+1.970	21 32 24.7	-4.67	17 34.0	Sept. 4	16 8 40.40	+4.017	20 54 4.9	-11.52	5 30.0
12	16 25 5.91	1.050	21 32 39.2	2.59	17 18.4	8	16 8 58.18	4.871	20 54 55.4	13.74	5 14.6
16	16 25 8.28	+0.135	21 32 45.4	-0.58	17 2.7	12	16 9 19.35	5.710	20 55 54.7	15.90	4 59.2
20	16 25 7.01	-0.770	21 32 43.4	+1.52	16 46.9	16	16 9 43.83	6.527	20 57 2.5	17.96	4 43.9
24	16 25 2.14	1.661	21 32 33.3	3.33	16 31.1	20	16 10 11.54	7.323	20 58 18.3	19.95	4 28.6
28	16 24 53.75	-2.531	21 32 15.2	+5.50	16 15.2	24	16 10 42.38	+8.092	20 59 42.0	-21.88	4 13.4
Apr. 1	16 24 41.92	3.379	21 31 49.4	7.43	15 59.3	28	16 11 16.25	8.839	21 1 13.2	23.68	3 58.2
5	16 24 26.75	4.202	21 31 15.8	9.32	15 43.3	Oct. 2	16 11 53.06	9.560	21 2 51.3	25.39	3 43.1
9	16 24 8.34	4.997	21 30 34.9	11.14	15 27.3	6	16 12 32.70	10.255	21 4 36.2	27.01	3 28.0
13	16 23 46.82	5.756	21 29 46.8	12.92	15 11.2	10	16 13 15.06	10.918	21 6 27.2	28.51	3 13.0
17	16 23 22.35	6.472	21 28 51.7	+14.59	14 55.0	14	16 13 59.99	+11.540	21 8 24.1	-29.86	2 58.0
21	16 22 55.11	7.138	21 27 50.2	16.17	14 38.8	18	16 14 47.33	12.122	21 10 26.0	31.08	2 33.1
25	16 22 25.32	7.749	21 26 42.5	17.67	14 22.6	22	16 15 36.91	12.663	21 12 32.6	32.18	2 28.2
29	16 21 53.19	8.307	21 25 29.0	19.05	14 6.3	26	16 16 28.58	13.165	21 14 43.2	33.15	2 13.3
May 3	16 21 18.94	8.809	21 24 10.2	20.33	13 50.0	30	16 17 22.18	13.631	21 16 57.6	34.00	1 58.5
7	16 20 42.79	9.257	21 22 46.5	+21.48	13 33.7	Nov. 3	16 18 17.57	+14.055	21 19 15.1	-34.71	1 43.7
11	16 20 4.97	9.641	21 21 18.5	22.50	13 17.3	7	16 19 14.56	14.431	21 21 35.1	35.07	1 28.9
15	16 19 25.75	9.957	21 19 46.7	23.38	13 0.9	11	16 20 12.95	14.756	21 23 57.1	35.71	1 14.2
19	16 18 45.41	10.201	21 18 11.7	24.09	12 44.6	15	16 21 12.54	15.032	21 26 20.6	36.00	0 59.4
23	16 18 4.24	10.372	21 16 34.2	24.64	12 28.2	19	16 22 13.14	15.258	21 28 44.9	36.15	0 44.7
27	16 17 22.53	-10.472	21 14 54.8	+25.05	12 11.7	23	16 23 14.54	+15.435	21 31 9.6	-36.18	0 30.0
31	16 16 40.55	-10.507	21 13 14.1	25.29	11 55.3	27	16 24 16.56	15.567	21 33 34.2	-36.10	0 15.3
June 4	16 15 58.56	-10.475	21 11 32.8	25.35	11 38.9	Dec. 1	16 25 19.01	15.648	21 35 58.2	35.88	0 0.0
8	16 15 16.84	-10.373	21 9 51.5	25.23	11 22.5	5	16 26 21.68	15.676	21 38 21.1	35.33	23 42.2
12	16 14 35.67	-10.199	21 8 11.2	24.92	11 6.1	9	16 27 24.35	15.650	21 40 42.3	35.07	23 27.5
16	16 13 55.34	-9.954	21 6 32.4	+24.44	10 49.7	13	16 28 26.81	+15.568	21 43 1.5	-34.49	23 12.8
20	16 13 16.13	-9.640	21 4 55.9	23.79	10 33.3	17	16 29 28.83	15.432	21 45 18.1	33.82	22 58.1
24	16 12 38.30	-9.266	21 3 22.3	22.95	10 16.9	21	16 30 30.20	15.247	21 47 31.9	33.05	22 43.4
28	16 12 2.08	-8.835	21 1 52.5	21.95	10 0.6	25	16 31 30.74	15.013	21 49 42.4	32.18	22 28.7
July 2	16 11 27.69	-8.352	21 0 26.9	20.80	9 44.3	29	16 32 30.24	14.728	21 51 49.2	31.22	22 13.9
6	16 10 55.33	-7.815	20 59 6.3	+19.46	9 28.1	33	16 33 28.50	+14.392	21 53 52.0	-30.17	21 59.2
	16 10 25.24	-7.222	20 57 51.4	+18.00	9 11.9		16 34 25.31		-21 55 50.4		21 44.4

Greatest semi-diameter,  
Least semi-diameter,

May 27, 1" 58"  
November 30, 1" 68"

Greatest horizontal parallax,  
Least horizontal parallax,

May 27, 0" 49"  
November 30, 0" 44"

## GREENWICH MEAN TIME.

Day and Month.	Apparent Right Ascension.			Var. of R. A. for 1 Day.		Apparent Declination.		Var. of Decl. for 1 Day.		Meridian Passage.	Day and Month.	Apparent Right Ascension.			Var. of R. A. for 1 Day.		Apparent Declination.		Var. of Decl. for 1 Day.		Meridian Passage.
	h	m	s	s	"	"	"	"	"			h	m	s	s	"	"	"	"	"	
Jan. 3	5	29	9.65	-6.790	+21	54	50.7	-3.60	10	35.8	July 2	5	38	49.31	+9.384	+22	7	13.9	+4.61	22	54.0
7	5	28	42.96	6.549	21	54	36.9	3.29	10	19.6	6	5	39	26.57	9.240	22	7	31.6	4.25	22	38.9
11	5	28	17.32	6.260	21	54	24.4	2.93	10	3.5	10	5	40	3.18	9.059	22	7	47.9	3.88	22	23.7
15	5	27	52.94	5.924	21	54	13.5	2.55	9	47.4	14	5	40	39.00	8.846	22	8	2.6	3.50	22	8.6
19	5	27	29.97	5.557	21	54	4.0	2.16	9	31.3	18	5	41	13.91	8.603	22	8	15.9	3.14	21	53.4
23	5	27	8.53	-5.154	+21	53	56.2	-1.74	9	15.2	22	5	41	47.79	+8.333	+22	8	27.7	+2.76	21	38.3
27	5	26	48.78	4.717	21	53	50.1	1.29	8	59.1	26	5	42	20.54	8.034	22	8	38.0	2.39	21	23.1
31	5	26	30.83	4.253	21	53	45.9	0.81	8	43.1	30	5	42	52.03	7.711	22	8	46.8	2.02	21	7.9
Feb. 4	5	26	14.79	3.762	21	53	43.6	-0.32	8	27.1	Aug. 3	5	43	22.19	7.358	22	8	54.2	1.67	20	52.6
8	5	26	0.77	3.243	21	53	43.3	+0.19	8	11.1	7	5	43	50.86	6.973	22	9	0.1	1.31	20	37.4
12	5	25	48.87	-2.705	+21	53	45.1	+0.70	7	55.2	11	5	44	17.94	+6.563	+22	9	4.7	+0.97	20	22.1
16	5	25	39.15	2.148	21	53	48.9	1.21	7	39.3	15	5	44	43.33	6.130	22	9	7.9	0.65	20	6.8
20	5	25	31.70	1.577	21	53	54.8	1.74	7	23.5	19	5	45	6.95	5.674	22	9	9.9	0.34	19	51.4
24	5	25	26.54	1.000	21	54	2.8	2.27	7	7.7	23	5	45	28.70	5.200	22	9	10.6	+0.02	19	36.1
28	5	25	23.71	-0.417	21	54	13.0	2.80	6	51.9	27	5	45	48.53	4.710	22	9	10.1	-0.27	19	20.7
Mar. 4	5	25	23.21	+0.170	+21	54	25.2	+3.30	6	36.2	31	5	46	6.35	+4.198	+22	9	8.4	-0.55	19	5.3
8	5	25	25.08	0.762	21	54	39.4	3.80	6	20.5	Sept. 4	5	46	22.09	3.665	22	9	5.7	0.80	18	49.8
12	5	25	29.31	1.356	21	54	55.6	4.27	6	4.8	8	5	46	35.65	3.115	22	9	2.0	1.05	18	34.3
16	5	25	35.92	1.943	21	55	13.6	4.75	5	49.2	12	5	46	47.00	2.558	22	8	57.3	1.29	18	18.7
20	5	25	44.84	2.518	21	55	33.6	5.20	5	33.6	16	5	46	56.10	1.991	22	8	51.7	1.50	18	3.1
24	5	25	56.05	+3.083	+21	55	55.2	+5.58	5	18.1	20	5	47	2.92	+1.418	+22	8	45.3	-1.70	17	47.5
28	5	26	9.49	3.636	21	56	18.2	5.95	5	2.6	24	5	47	7.44	0.841	22	8	38.1	1.90	17	31.8
Apr. 1	5	26	25.12	4.174	21	56	42.8	6.31	4	47.1	28	5	47	9.64	+0.257	22	8	30.1	2.07	17	16.1
5	5	26	42.86	4.696	21	57	8.7	6.61	4	31.7	Oct. 2	5	47	9.50	-0.326	22	8	21.5	2.22	17	0.4
9	5	27	2.67	5.203	21	57	35.7	6.89	4	16.3	6	5	47	7.04	0.906	22	8	12.3	2.37	16	44.6
13	5	27	24.46	+5.689	+21	58	3.8	+7.12	4	0.9	10	5	47	2.26	-1.481	+22	8	2.5	-2.51	16	28.8
17	5	27	48.15	6.149	21	58	32.7	7.32	3	45.6	14	5	46	55.21	2.042	22	7	52.2	2.62	16	13.0
21	5	28	13.62	6.583	21	59	2.4	7.49	3	30.3	18	5	46	45.94	2.591	22	7	41.5	2.73	15	57.1
25	5	28	40.78	6.992	21	59	32.6	7.61	3	15.0	22	5	46	34.50	3.127	22	7	30.4	2.84	15	41.2
29	5	29	9.52	7.375	22	0	3.3	7.70	2	59.8	26	5	46	20.95	3.642	22	7	18.8	2.94	15	25.2
May 3	5	29	39.75	+7.735	+22	0	34.2	+7.74	2	44.6	30	5	46	5.39	-4.137	+22	7	6.9	-3.01	15	9.2
7	5	30	11.36	8.066	22	1	5.2	7.74	2	29.4	Nov. 3	5	45	47.89	4.606	22	6	54.7	3.07	14	53.2
11	5	30	44.24	8.368	22	1	36.1	7.70	2	14.2	7	5	45	28.58	5.047	22	6	42.3	3.12	14	37.1
15	5	31	18.26	8.636	22	2	6.8	7.68	1	59.0	11	5	45	7.55	5.460	22	6	29.7	3.16	14	21.0
19	5	31	53.29	8.874	22	2	37.1	7.52	1	43.8	15	5	44	44.95	5.834	22	6	17.0	3.20	14	4.9
23	5	32	29.21	+9.079	+22	3	7.0	+7.39	1	28.7	19	5	44	20.93	-6.168	+22	6	4.1	-3.22	13	48.8
27	5	33	5.88	9.254	22	3	36.2	7.21	1	13.6	23	5	43	55.65	6.467	22	5	51.2	3.21	13	32.7
31	5	33	43.20	9.400	22	4	4.7	7.01	0	58.5	27	5	43	29.24	6.731	22	5	38.4	3.20	13	16.5
June 4	5	34	21.04	9.514	22	4	32.3	6.79	0	43.4	Dec. 1	5	43	1.86	6.951	22	5	25.6	3.17	13	0.3
8	5	34	59.27	9.594	22	4	59.0	6.54	0	28.3	5	5	42	33.70	7.121	22	5	13.0	3.12	12	44.1
12	5	35	37.76	+9.642	+22	5	24.6	+6.25	0	13.2	9	5	42	4.96	-7.242	+22	5	0.6	-3.06	12	27.9
16	5	36	16.36	9.653	22	5	49.0	5.95	23	54.3	13	5	41	35.83	7.315	22	4	48.5	2.97	12	11.7
20	5	36	54.94	9.631	22	6	12.2	5.64	23	39.3	17	5	41	6.50	7.343	22	4	36.8	2.87	11	55.5
24	5	37	33.37	9.580	22	6	34.1	5.31	23	24.2	21	5	40	37.15	7.324	22	4	25.5	2.75	11	39.3
28	5	38	11.54	9.498	22	6	54.7	4.97	23	9.1	25	5	40	7.97	7.258	22	4	14.8	2.59	11	23.1
July 2	5	38	49.31	+9.384	+22	7	13.9	+4.61	22	54.0	29	5	39	39.15	-7.146	+22	4	4.8	-2.41	11	6.9
6	5	39	26.57	+9.240	+22	7	31.6	+4.25	22	38.9	33	5	39	10.86	+7.222	+22	3	55.5		10	50.7

Greatest semidiameter,  
Least semidiameter.

December 17, 17.33  
June 15, 17.25

Greatest horizontal parallax,  
Least horizontal parallax.

December 17, 0".31  
June 15, 0".29

MERCURY.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. -1	140 9 34.5	5 13 10.7	-1 21.0	+6 59 36.7	-2 0.2	9.5319155	9.8829952	9.8935501
1	150 16 36.4	4 53 54.1	5 40.9	6 49 17.2	8 5.8	9.5455537	9.9042829	9.9150565
3	159 45 39.3	4 35 19.2	9 7.1	6 28 7.5	12 51.0	9.5594211	9.9257616	9.9363112
5	168 38 45.9	4 18 2.0	11 27.3	5 58 42.0	16 23.4	9.5730993	9.9466410	9.9567026
7	176 58 51.4	4 2 20.4	12 39.4	5 23 15.0	18 54.5	9.5862759	9.9664629	9.9759001
9	184 49 16.6	3 48 22.1	-12 49.1	+4 43 37.0	-20 56.3	9.5987306	9.9850001	9.9937571
11	192 13 28.0	3 36 6.0	12 5.9	4 1 15.3	21 39.8	9.6103134	0.0021698	0.0102410
13	199 14 45.5	3 25 27.2	10 40.0	3 17 17.2	22 14.1	9.6209274	0.0179758	0.0253822
15	205 56 17.1	3 16 19.0	8 42.0	2 32 33.6	22 26.4	9.6305148	0.0324693	0.0392474
17	212 20 57.0	3 8 34.4	6 22.2	1 47 42.3	22 22.6	9.6390437	0.0457269	0.0519181
19	218 31 25.2	3 2 5.6	-3 49.4	+1 3 11.2	-22 6.6	9.6465004	0.0578320	0.0634792
21	224 30 5.3	2 56 45.7	-1 11.3	+0 19 22.2	21 41.3	9.6528825	0.0688701	0.0740146
23	230 19 10.5	2 52 29.3	+1 26.0	-0 23 29.5	21 9.4	9.6581935	0.0789221	0.0836012
25	236 0 42.9	2 49 12.0	3 56.5	1 5 11.4	20 31.8	9.6624406	0.0880614	0.0923096
27	241 36 36.4	2 46 50.0	6 15.2	1 45 33.3	19 49.4	9.6656316	0.0963540	0.1002013
29	247 8 37.9	2 45 20.0	+8 18.2	-2 24 26.4	-19 2.9	9.6677741	0.1038578	0.1073293
31	252 38 29.8	2 44 40.1	10 1.8	3 1 42.4	18 12.3	9.6688730	0.1106211	0.1137385
Feb. 2	258 7 51.0	2 44 49.2	11 23.1	3 37 12.6	17 17.2	9.6689315	0.1166853	0.1194655
4	263 38 19.3	2 45 47.2	12 19.4	4 10 47.6	16 17.0	9.6679494	0.1220830	0.1245399
6	269 11 32.9	2 47 34.7	12 48.6	4 42 16.4	15 10.8	9.6659242	0.1268390	0.1289820
8	274 49 12.1	2 50 13.1	+12 48.7	-5 11 26.2	-13 57.6	9.6628513	0.1309706	0.1328054
10	280 33 0.6	2 53 44.4	12 18.4	5 38 1.2	12 35.8	9.6587233	0.1344870	0.1360147
12	286 24 46.8	2 58 11.5	11 17.1	6 1 42.4	11 3.6	9.6553520	0.1373883	0.1386061
14	292 26 26.6	3 3 38.5	9 44.9	6 22 6.6	9 18.5	9.6472707	0.1396666	0.1405670
16	298 40 3.9	3 10 9.8	7 42.7	6 38 45.8	7 18.0	9.6399352	0.1413039	0.1418729
18	305 7 52.0	3 17 50.3	+5 13.2	-6 51 6.0	-4 58.9	9.6315266	0.1422697	0.1424883
20	311 52 15.2	3 26 45.9	+2 20.8	6 58 26.5	-2 17.7	9.6220572	0.1425223	0.1423638
22	318 55 49.3	3 37 2.0	-0 48.1	6 59 59.4	+2 49.5	9.6115566	0.1420044	0.1414336
24	326 21 20.4	3 48 43.8	4 3.5	6 54 48.8	4 26.3	9.6000787	0.1406413	0.1396148
26	334 11 43.7	4 1 54.7	7 12.9	6 41 52.1	8 56.1	9.5877161	0.1383407	0.1368038
28	342 29 58.9	4 16 35.3	-9 56.5	-6 20 1.4	+13 20.4	9.5746110	0.1349880	0.1328750
Mar. 2	351 19 1.3	4 32 40.6	11 56.9	5 48 8.5	12 37.6	9.5609757	0.1304458	0.1276799
4	0 41 29.3	4 49 57.8	12 51.2	5 5 13.1	24 21.2	9.5471110	0.1245549	0.1210481
6	10 39 24.0	5 8 2.2	12 19.2	4 10 36.1	30 16.0	9.5334223	0.1171351	0.1127919
8	21 13 43.0	5 26 13.8	10 8.5	3 4 18.4	35 56.7	9.5204307	0.1079941	0.1027170
10	32 23 46.0	5 43 35.1	-6 21.2	-1 47 23.0	+40 46.8	9.5087610	0.0969383	0.0906379
12	44 6 41.1	5 58 32.8	-1 21.4	-0 22 15.2	44 1.3	9.4991017	0.0837967	0.0763998
14	56 16 58.8	6 20 48.4	+4 3.3	+1 7 9.1	44 56.5	9.4921281	0.0684393	0.0599120
16	68 46 22.3	6 37 45.9	8 50.9	2 35 37.8	43 2.8	9.4883929	0.0508195	0.0411711
18	81 24 16.3	6 59 6.5	11 59.7	3 57 25.8	38 18.0	9.4882176	0.0309848	0.0202852
20	93 58 48.7	6 14 26.0	+12 50.5	+5 7 15.8	+31 12.2	9.4916168	0.0091038	9.9974789
22	106 18 17.0	6 4 15.0	11 19.2	6 1 17.9	22 40.6	9.4982975	9.9854565	9.9730877
24	118 12 40.1	5 49 34.0	7 52.5	6 37 41.8	13 44.4	9.5077246	9.9604297	9.9475437
26	129 34 31.9	5 31 57.3	+3 20.6	6 56 34.8	+5 17.1	9.5192298	9.9344957	9.9213566
28	140 19 28.9	5 12 32.8	-1 25.1	6 59 32.9	-2 6.5	9.5321219	9.9081995	9.8951019
30	150 25 54.5	4 53 36.2	-5 44.6	+6 49 2.0	-2 10.8	9.5457675	9.8821445	9.8694101
32	159 54 22.7	4 35 2.3	-9 9.8	+6 27 43.5	-12 54.8	9.5596348	9.8569839	9.8449536

## MERCURY.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Apr.	1 159 54 22.7	4 35 2.3	- 9 9.8	+6 27 43.5	-12 54.8	9.5596348	9.8569839	9.8449536
	3 168 46 56.7	4 17 46.3	11 28.8	5 58 11.4	16 26.2	9.5733073	9.8334073	9.8224332
	5 177 6 33.1	4 2 6.5	12 40.0	5 22 39.7	18 56.4	9.5864747	9.8121178	9.8025437
	7 184 56 32.2	3 48 9.6	12 48.8	4 42 58.5	20 37.6	9.5989169	9.7937880	9.7859215
	9 192 20 20.5	3 35 55.2	12 4.8	4 0 34.9	21 40.5	9.6104854	9.7790050	9.7730878
	11 199 21 18.1	3 25 17.9	-10 38.3	+3 16 35.8	-22 14.4	9.6210838	9.7682069	9.7643841
	13 206 2 32.8	3 16 11.4	8 40.0	2 31 51.8	22 26.5	9.6306550	9.7616267	9.7599278
	15 212 26 59.0	3 8 27.8	6 20.0	1 47 0.6	22 22.4	9.6391672	9.7592656	9.7596052
	17 218 37 14.6	3 1 59.8	3 47.1	1 2 30.3	22 6.2	9.6466073	9.7609014	9.7630986
	19 224 35 44.7	2 56 47.3	- 1 8.7	+0 18 41.8	21 41.0	9.6529726	9.7661354	9.7699441
	21 230 24 42.2	2 52 26.2	+ 1 28.4	-0 24 8.9	-21 8.8	9.6582673	9.7744544	9.7795975
	23 236 6 8.7	2 49 9.7	3 58.7	1 5 49.6	20 31.2	9.6624978	9.7853032	9.7915051
	25 241 41 57.7	2 46 48.2	6 17.1	1 46 10.3	19 48.8	9.6656724	9.7981394	9.8051459
	27 247 13 56.2	2 45 18.9	8 19.9	2 25 1.9	19 2.2	9.6677985	9.8124694	9.8200596
	29 252 43 46.7	2 44 39.8	10 3.3	3 2 16.3	18 11.4	9.6688813	9.8278717	9.8358635
May	1 258 13 8.2	2 44 49.7	+11 24.2	-3 37 44.8	-17 16.2	9.6689235	9.8439994	9.8522466
	3 263 43 38.2	2 45 48.5	12 20.1	4 11 17.9	16 16.0	9.6679252	9.8605771	9.8689660
	5 269 16 55.3	2 47 36.8	12 48.8	4 42 44.7	15 9.8	9.6658838	9.8773908	9.8858337
	7 274 54 39.4	2 50 15.8	12 48.4	5 11 52.2	13 56.4	9.6627943	9.8942781	9.9027104
	9 280 38 34.1	2 53 48.0	12 17.7	5 38 24.6	12 34.4	9.6586499	9.9111175	9.9194893
	11 286 30 28.6	2 58 16.1	+11 15.9	-6 2 2.9	-11 2.0	9.6534422	9.9278168	9.9360917
	13 292 32 18.3	3 3 43.9	9 43.1	6 22 23.9	9 16.8	9.6471645	9.9443067	9.9524553
	15 298 46 7.3	3 10 16.2	7 40.4	6 38 59.5	7 16.0	9.6398121	9.9605317	9.9685298
	17 305 14 9.7	3 17 58.2	5 10.7	6 51 15.2	4 56.5	9.6313873	9.9764437	9.9842680
	19 311 58 50.0	3 26 54.9	+ 2 17.7	6 58 30.7	- 2 15.0	9.6219020	9.9919973	9.9996250
	21 319 2 42.9	3 37 12.0	- 0 51.3	-6 59 57.8	+ 0 52.6	9.6113860	0.0071447	0.0145489
	23 326 28 35.4	3 48 55.1	4 6.5	6 54 40.5	4 29.9	9.5998941	0.0218304	0.0289805
	25 334 19 23.4	4 2 7.6	7 14.6	6 41 36.1	8 40.2	9.5875190	0.0359893	0.0428460
	27 342 38 5.8	4 16 49.7	9 58.7	6 19 36.6	13 25.0	9.5744043	0.0495387	0.0560532
	29 351 27 38.5	4 32 56.3	11 58.4	5 47 33.8	18 42.9	9.5607634	0.0623800	0.0684968
	31 0 50 38.7	4 50 14.4	-12 51.4	-5 4 27.7	+24 26.6	9.5468985	0.0743894	0.0800388
June	2 10 49 7.3	5 8 19.1	12 18.0	4 9 39.8	30 21.4	9.5332170	0.0854244	0.0905245
	4 21 23 59.8	5 26 30.4	10 5.5	3 3 11.5	36 1.8	9.5202417	0.0953168	0.0997786
	6 32 34 35.1	5 43 50.5	6 17.1	1 46 7.1	40 51.2	9.5085978	0.1038861	0.1076163
	8 44 17 58.4	5 59 5.4	- 1 16.4	-0 20 53.4	44 3.3	9.4989755	0.1109469	0.1138575
	10 56 28 37.7	6 10 51.9	+ 4 8.3	+1 8 32.6	+44 56.1	9.4920483	0.1163289	0.1183460
	12 68 58 13.7	6 17 50.5	8 54.8	2 36 57.7	42 59.6	9.4883667	0.1198972	0.1209748
	14 81 36 9.8	6 19 5.2	12 1.6	3 58 36.7	38 12.4	9.4882467	0.1215754	0.1217008
	16 94 10 33.2	6 14 18.8	12 50.1	5 8 13.6	31 5.0	9.4916994	0.1213567	0.1205542
	18 106 29 42.9	6 4 0.2	11 16.1	6 1 59.8	22 32.3	9.4984268	0.1193070	0.1176329
	20 118 23 37.7	5 49 17.6	+ 7 48.7	+6 38 7.2	+13 36.2	9.5078910	0.1155515	0.1130850
	22 129 44 56.3	5 31 39.6	+ 3 16.3	6 56 44.5	+ 5 9.7	9.5194225	0.1102555	0.1070867
	24 140 29 18.1	5 12 34.6	- 1 30.0	6 59 29.0	- 2 12.7	9.5323304	0.1036018	0.0998227
	26 150 35 7.6	4 53 18.5	5 48.2	6 48 46.8	8 15.8	9.5459830	0.0957708	0.0914671
28	160 3 1.5	4 34 45.9	9 12.5	6 27 19.6	12 58.6	9.5598497	0.0869305	0.0821783
30	168 55 3.5	4 17 31.2	-11 30.2	+5 57 41.0	-16 28.9	9.5735160	0.0772262	0.0720894
32	177 14 11.0	4 1 53.1	-12 40.5	+5 22 4.6	-18 58.3	9.5866730	0.0667805	0.0613108

VENUS.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. -1	116 8 5.3	1 37 22.9	+2 58.6	+2 11 57.3	+4 23.6	9.8564608	9.5646751	9.5791605
+3	122 37 45.5	1 37 26.9	3 0.6	2 28 39.0	3 56.6	9.8563999	9.5935995	9.6079347
7	129 7 39.4	1 37 29.8	2 53.3	2 43 26.3	3 26.6	9.8563761	9.6221208	9.6361225
11	135 37 42.6	1 37 31.6	2 37.1	2 56 7.9	2 53.8	9.8563902	9.6499131	9.6634752
15	142 7 50.3	1 37 32.1	2 12.9	3 6 33.7	2 18.8	9.8564416	9.6767957	9.6898656
19	148 37 57.3	1 37 31.2	+1 41.9	+3 14 35.6	+1 41.9	9.8565298	9.7026803	9.7152388
23	155 7 58.1	1 37 28.9	1 5.7	3 20 7.4	1 3.8	9.8566537	9.7275391	9.7395809
27	161 37 47.0	1 37 25.3	+0 26.1	3 23 5.2	+0 25.0	9.8568115	9.7513659	9.7628950
31	168 7 18.5	1 37 20.3	-0 14.7	3 23 26.8	-0 14.1	9.8570011	9.7741702	9.7851946
Feb. 4	174 36 27.4	1 37 14.0	0 54.9	3 21 12.5	0 52.9	9.8572203	9.7959718	9.8065062
8	181 5 8.4	1 37 6.4	-1 32.1	+3 16 24.4	-1 31.0	9.8574659	9.8168033	9.8268696
12	187 33 17.1	1 36 57.8	2 4.6	3 9 6.8	2 7.8	9.8577347	9.8367120	9.8463377
16	194 0 49.7	1 36 48.3	2 30.9	2 59 25.8	2 42.7	9.8580236	9.8557538	9.8649675
20	200 27 42.7	1 36 38.0	2 49.3	2 47 29.6	3 15.1	9.8583285	9.8739856	9.8828135
24	206 53 53.7	1 36 27.4	2 59.1	2 33 27.7	3 45.0	9.8586455	9.8914564	9.8999191
28	213 19 21.8	1 36 16.6	-3 0.1	+2 17 31.5	-4 12.2	9.8589710	9.9082061	9.9163208
Mar. 4	219 44 6.1	1 36 5.6	2 52.2	1 59 53.4	4 36.1	9.8593004	9.9242664	9.9320472
8	226 8 6.6	1 35 54.7	2 35.6	1 40 47.2	4 56.3	9.8596297	9.9396670	9.9471300
12	232 31 24.6	1 35 44.4	2 11.3	1 20 27.6	5 12.8	9.8599549	9.9544412	9.9616052
16	238 54 2.1	1 35 34.5	1 40.6	0 59 10.0	5 25.3	9.8602721	9.9686262	9.9755096
20	245 16 1.8	1 35 25.4	-1 5.0	+0 37 10.5	-3 33.8	9.8605771	9.9822599	9.9888808
24	251 37 26.9	1 35 17.2	-0 26.2	+0 14 45.3	5 38.1	9.8608664	9.9953758	0.0017478
28	257 58 21.2	1 35 10.1	+0 13.9	-0 7 49.0	5 38.3	9.8611361	0.0079992	0.0141323
Apr. 1	264 18 49.0	1 35 4.0	0 53.2	0 30 16.0	5 34.4	9.8613834	0.0201489	0.0260506
5	270 38 54.7	1 34 59.0	1 29.9	0 52 19.3	5 26.6	9.8616052	0.0318391	0.0375167
9	276 58 43.0	1 34 55.3	+2 2.1	-1 13 43.2	-3 14.7	9.8617986	0.0430851	0.0485471
13	283 18 18.5	1 34 52.7	2 28.4	1 34 12.1	4 59.1	9.8619617	0.0539051	0.0591619
17	289 37 45.8	1 34 51.2	2 47.5	1 53 31.4	4 40.0	9.8620921	0.0643204	0.0693832
21	295 57 9.3	1 34 50.8	2 58.4	2 11 27.4	4 17.5	9.8621886	0.0743322	0.0792294
25	302 16 33.2	1 34 51.4	3 0.7	2 27 47.0	3 51.9	9.8622497	0.0840158	0.0887134
29	308 36 1.3	1 34 52.8	+2 54.2	-2 42 18.7	-3 23.5	9.8622750	0.0933229	0.0978440
May 3	314 55 37.0	1 34 55.2	2 39.3	2 54 52.0	2 32.7	9.8622644	0.1022770	0.1066228
7	321 15 23.6	1 34 58.2	2 16.6	3 5 17.7	2 19.8	9.8622175	0.1108830	0.1150582
11	327 35 23.5	1 35 1.9	1 47.3	3 13 28.3	1 45.2	9.8621353	0.1191493	0.1231582
15	333 55 39.2	1 35 6.1	1 12.7	3 19 17.6	1 9.2	9.8620185	0.1270860	0.1309351
19	340 16 12.5	1 35 10.7	+0 34.5	-3 22 41.0	-0 32.4	9.8618686	0.1347060	0.1384006
23	346 37 4.9	1 35 15.6	-0 5.3	3 23 36.0	+0 4.9	9.8616873	0.1420194	0.1455638
27	352 58 17.6	1 35 20.8	0 44.9	3 22 1.4	0 42.3	9.8614769	0.1490335	0.1524290
31	359 19 51.7	1 35 26.3	1 22.4	3 17 57.8	1 19.3	9.8612397	0.1557500	0.1589964
June 4	5 41 48.2	1 35 32.0	1 55.8	3 11 27.9	1 55.4	9.8609788	0.1621686	0.1652666
8	12 4 7.7	1 35 37.8	-2 23.6	-3 2 36.0	+2 30.3	9.8606972	0.1682908	0.1712421
12	18 26 50.8	1 35 45.8	2 44.4	2 51 28.0	3 3.4	9.8603983	0.1741212	0.1769288
16	24 49 58.1	1 35 49.9	2 57.0	2 38 11.7	3 34.4	9.8600859	0.1796661	0.1823343
20	31 13 30.3	1 35 56.2	3 0.9	2 22 56.3	4 2.8	9.8597636	0.1849343	0.1874673
24	37 37 28.1	1 36 2.7	2 55.8	2 5 53.0	4 22.3	9.8594355	0.1899338	0.1923325
28	44 1 52.1	1 36 9.3	-2 42.0	-1 47 13.9	+4 30.6	9.8591058	0.1946640	0.1969285
32	50 26 42.9	1 36 16.1	-2 20.0	-1 27 12.6	+3 9.4	9.8587785	0.1991257	0.2012547

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox, of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth.	
							At Date.	At Intermediate Date.
Oct.	2 192 33 56.9	3 35 34.3	-12 2.7	+3 59 14.9	-21 42.0	9.6108243	0.1483832	0.1495704
	4 199 34 15.7	3 25 0.1	10 35.2	3 15 13.8	22 15.1	9.6213917	0.1505319	0.1512777
	6 206 14 57.3	3 15 55.9	8 36.0	2 30 29.0	22 26.6	9.6309306	0.1518163	0.1521556
	8 212 38 54.6	3 8 14.7	6 15.4	1 45 38.0	22 22.1	9.6394101	0.1523029	0.1522644
	10 218 48 46.7	3 1 49.2	3 42.2	1 1 8.7	22 5.6	9.6468173	0.1520450	0.1516496
	12 224 46 57.5	2 56 32.6	-1 3.8	+0 17 21.8	-21 40.1	9.6531497	0.1510820	0.1503449
	14 230 35 39.3	2 52 19.2	+1 33.1	-0 25 27.0	22 7.7	9.6584116	0.1494412	0.1483726
	16 236 16 53.6	2 49 4.5	4 3.1	1 7 5.4	20 29.9	9.6626101	0.1471402	0.1457448
	18 241 52 33.9	2 46 44.7	6 21.2	1 47 23.4	19 47.4	9.6657530	0.1441863	0.1424640
	20 247 24 27.2	2 45 17.0	8 23.3	2 26 12.2	19 0.7	9.6678474	0.1405777	0.1385252
	22 252 54 15.1	2 44 39.2	+10 6.1	-3 3 23.4	-18 9.8	9.6688987	0.1363044	0.1339127
	24 258 23 36.8	2 44 50.7	11 26.4	3 38 48.5	17 14.5	9.6689095	0.1313473	0.1286042
	26 263 54 10.5	2 45 51.1	12 21.4	4 12 17.9	16 14.0	9.6678797	0.1256790	0.1225671
	28 269 27 34.0	2 47 40.8	12 49.2	4 43 40.6	15 7.6	9.6658070	0.1192632	0.1157617
	30 275 5 27.6	2 50 21.4	12 47.9	5 12 43.5	13 54.0	9.6626858	0.1120559	0.1081390
Nov.	1 280 49 35.0	2 53 55.1	+12 16.1	-5 39 10.8	-12 31.8	9.6585095	0.1040029	0.0996396
	3 286 41 45.5	2 58 25.0	11 13.4	6 2 43.4	10 58.9	9.6532695	0.0950405	0.0901963
	5 292 43 54.8	3 3 54.6	9 39.9	6 22 57.9	9 13.2	9.6469592	0.0850968	0.0797314
	7 298 58 7.2	3 10 28.9	7 36.4	6 39 25.9	7 12.0	9.6395742	0.0740891	0.0681584
	9 305 26 37.0	3 18 12.9	5 5.6	6 51 33.2	4 52.0	9.6311165	0.0619274	0.0553833
	11 312 11 48.8	3 27 11.9	+2 12.2	-6 58 38.8	-2 9.6	9.6215988	0.0485138	0.0413064
	13 319 16 18.6	3 37 31.8	-0 57.1	6 59 54.4	+0 58.7	9.6110519	0.0337491	0.0258308
	15 326 42 53.5	3 49 17.8	4 12.3	6 54 23.9	4 37.0	9.5995311	0.0175406	0.0088696
	17 334 34 29.4	4 2 33.0	7 20.3	6 41 4.2	8 48.4	9.5871303	9.9998130	9.9903687
	19 342 54 5.0	4 17 17.3	10 3.4	6 18 47.4	13 34.2	9.5739953	9.9805402	9.9703377
	21 351 44 35.2	4 33 26.4	-12 1.0	-5 46 25.3	+18 53.0	9.5603416	9.9597807	9.9489000
	23 1 8 38.3	4 50 46.7	12 51.8	5 2 58.3	24 57.4	9.5464746	9.9377422	9.9263715
Dec.	5 69 21 35.4	5 8 52.5	12 15.5	4 7 48.8	30 32.2	9.5328049	9.9148756	9.9033667
	7 81 59 36.8	5 27 3.2	10 0.4	3 0 59.9	36 11.5	9.5198590	9.8919884	9.8809159
	9 94 33 44.1	5 44 20.7	6 8.8	1 43 38.0	40 58.2	9.5082656	9.8703564	9.8605478
	11 106 52 17.8	6 3 58.0	+11 11.2	+6 3 22.0	+28 16.0	9.4986704	9.8517486	9.8442273
	13 118 45 21.0	5 48 48.5	7 41.0	6 38 56.6	13 20.1	9.5082081	9.8787880	9.8898683
	15 130 5 35.9	5 31 6.0	+3 7.4	6 57 3.1	+4 55.1	9.5197920	9.9013008	9.9128978
	17 140 48 49.2	5 18 0.0	-1 38.4	6 59 20.4	-2 25.1	9.5327323	9.9245051	9.9359990
	19 150 53 29.7	4 52 44.3	5 55.4	6 48 16.0	8 25.6	9.5463990	9.9472845	9.9582904
	21 160 20 16.7	4 34 13.5	-9 17.8	+6 26 31.4	-13 6.1	9.5602659	9.9689657	9.9792758
	23 169 11 16.5	4 17 1.5	11 33.5	5 56 39.8	16 34.4	9.5739217	9.9891988	9.9987228
	25 177 29 27.4	4 1 26.3	12 41.8	5 20 54.2	19 2.1	9.5870602	0.0078440	0.0165645
	27 185 18 10.3	3 47 33.9	12 47.9	4 41 3.7	20 41.3	9.5994655	0.0248901	0.0328295
	29 192 40 51.3	3 35 24.0	12 1.6	3 58 34.2	21 42.8	9.6109917	0.0403938	0.0475957
	31 199 40 50.9	3 24 51.0	-10 33.5	+3 14 31.9	-22 15.4	9.6215446	0.0544484	0.0609649
	33 206 21 15.5	3 15 48.2	-8 34.0	+2 29 46.8	-22 26.6	9.6310681	0.0671589	0.0730443



VENUS.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan. —1	116° 8' 5.5	1 37 22.9	+2 58.6	+2 11 57.3	+4 23.6	9.8564608	9.5646751	9.5791605
+3	122 37 45.5	1 37 26.9	3 0.6	2 28 39.0	3 56.6	9.8563999	9.5935995	9.6079347
7	129 7 39.4	1 37 29.8	2 53.3	2 43 26.3	3 26.6	9.8563761	9.6221208	9.6361225
11	135 37 42.6	1 37 31.6	2 37.1	2 56 7.9	2 53.8	9.8563902	9.6499131	9.6634752
15	142 7 50.3	1 37 32.1	2 12.9	3 6 33.7	2 18.8	9.8564416	9.6767957	9.6898656
19	148 37 57.3	1 37 31.2	+1 41.9	+3 14 35.6	+1 41.9	9.8565298	9.7026803	9.7152388
23	155 7 58.1	1 37 28.9	1 5.7	3 20 7.4	1 3.8	9.8566537	9.7275391	9.7395809
27	161 37 47.0	1 37 25.3	+0 26.1	3 23 5.2	+0 25.0	9.8568115	9.7513659	9.7628950
31	168 7 18.5	1 37 20.3	—0 14.7	3 23 26.8	—0 14.1	9.8570011	9.7741702	9.7851946
Feb. 4	174 36 27.4	1 37 14.0	0 54.9	3 21 12.5	0 52.9	9.8572203	9.7959718	9.8065062
8	181 5 8.4	1 37 6.4	—1 32.1	+3 16 24.4	—1 31.0	9.8574659	9.8168033	9.8268696
12	187 33 17.1	1 36 57.8	2 4.6	3 9 6.8	2 7.8	9.8577347	9.8367120	9.8463377
16	194 0 49.7	1 36 48.3	2 30.9	2 59 25.8	2 42.7	9.8580236	9.8557538	9.8649675
20	200 27 42.7	1 36 38.0	2 49.3	2 47 29.6	3 15.1	9.8583285	9.8739856	9.8828135
24	206 53 53.7	1 36 27.4	2 59.1	2 33 27.7	3 45.0	9.8586455	9.8914564	9.8999191
28	213 19 21.8	1 36 16.6	—3 0.1	+2 17 31.5	—4 12.2	9.8589710	9.9082061	9.9163208
Mar. 4	219 44 6.1	1 36 5.6	2 52.2	1 59 53.4	4 36.1	9.8593004	9.9242664	9.9320472
8	226 8 6.6	1 35 54.7	2 35.6	1 40 47.2	4 56.3	9.8596297	9.9396670	9.9471300
12	232 31 24.6	1 35 44.4	2 11.3	1 20 27.6	5 12.8	9.8599549	9.9544412	9.9616052
16	238 54 2.1	1 35 34.5	1 40.6	0 59 10.0	5 25.3	9.8602721	9.9686262	9.9755096
20	245 16 1.8	1 35 25.4	—1 5.0	+0 37 10.5	—3 33.8	9.8605771	9.9822599	9.9888808
24	251 37 26.9	1 35 17.2	—0 26.2	+0 14 45.3	3 32.1	9.8608664	9.9953758	0.0017478
28	257 58 21.2	1 35 10.1	+0 13.9	—0 7 49.0	3 38.3	9.8611361	0.0079992	0.0141323
Apr. 1	264 18 49.0	1 35 4.0	0 53.2	0 30 16.0	3 34.4	9.8613834	0.0201489	0.0260506
5	270 38 54.7	1 34 59.0	1 29.9	0 52 19.3	3 26.6	9.8616052	0.0318391	0.0375167
9	276 58 43.0	1 34 55.3	+2 2.1	—1 13 43.2	—3 14.7	9.8617986	0.0430851	0.0485471
13	283 18 18.5	1 34 52.7	2 28.4	1 34 12.1	4 59.1	9.8619617	0.0539051	0.0591619
17	289 37 45.8	1 34 51.2	2 47.5	1 53 31.4	4 40.0	9.8620921	0.0643204	0.0693832
21	295 57 9.3	1 34 50.8	2 58.4	2 11 27.4	4 17.5	9.8621886	0.0743522	0.0792294
25	302 16 33.2	1 34 51.4	3 0.7	2 27 47.0	3 51.9	9.8622497	0.0840158	0.0887134
29	308 36 1.3	1 34 52.8	+2 54.2	—2 42 18.7	—3 25.5	9.8622750	0.0933229	0.0978440
May 3	314 55 37.0	1 34 55.2	2 39.3	2 54 52.0	2 52.7	9.8622644	0.1022770	0.1066228
7	321 15 23.6	1 34 58.2	2 16.6	3 5 17.7	2 19.8	9.8622175	0.1108830	0.1150582
11	327 35 23.5	1 35 1.9	1 47.3	3 13 28.3	1 45.2	9.8621353	0.1191493	0.1231582
15	333 55 39.2	1 35 6.1	1 12.7	3 19 17.6	1 9.2	9.8620185	0.1270860	0.1309351
19	340 16 12.5	1 35 10.7	+0 34.5	—3 22 41.0	—0 32.4	9.8618686	0.1347060	0.1384006
23	346 37 4.9	1 35 15.6	—0 5.3	3 23 36.0	+0 4.9	9.8616873	0.1420194	0.1455638
27	352 58 17.6	1 35 20.8	0 44.9	3 22 1.4	0 42.3	9.8614769	0.1490335	0.1524290
31	359 19 51.7	1 35 26.3	1 22.4	3 17 57.8	1 29.3	9.8612397	0.1557500	0.1589964
June 4	5 41 48.2	1 35 32.0	1 55.8	3 11 27.9	1 55.4	9.8609788	0.1621686	0.1652666
8	12 4 7.7	1 35 37.8	—2 23.6	—3.2 36.0	+2 30.3	9.8606972	0.1682908	0.1712421
12	18 26 50.8	1 35 43.8	2 44.4	2 51 28.0	3 3.4	9.8603983	0.1741212	0.1769288
16	24 49 58.1	1 35 49.9	2 57.0	2 38 11.7	3 34.4	9.8600859	0.1796661	0.1823343
20	31 13 30.3	1 35 56.2	3 0.9	2 22 56.3	4 2.8	9.8597636	0.1849343	0.1874673
24	37 37 28.1	1 36 2.7	2 55.8	2 5 53.0	4 22.3	9.8594355	0.1899338	0.1923325
28	44 1 52.1	1 36 9.3	—2 42.0	—1 47 13.9	+4 20.6	9.8591058	0.1946640	0.1969285
32	50 26 42.9	1 36 16.1	—2 20.0	—1 27 12.6	+3 9.4	9.8587758	0.1991257	0.2012547

## VENUS.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—			
							At Date.	At Intermediate Date.		
July	2	50° 26' 42.9	1 36 16.1	-2 20.0	-1 27 12.6	+5 9.4	9.85877785	0.1991257	0.2012547	
	6	56 52 1.2	1 36 23.1	1 51.0	1 6 3.9	5 24.3	9.8584577	0.2033159	0.2053097	
	10	63 17 47.6	1 36 30.2	1 16.4	0 44 3.6	5 35.2	9.8581475	0.2072366	0.2090972	
	14	69 44 2.5	1 36 37.3	-0 37.9	-0 21 28.1	5 41.8	9.8578519	0.2108926	0.2126237	
	18	76 10 46.1	1 36 44.5	+0 2.5	+0 1 25.5	5 44.2	9.8575746	0.2142910	0.2158958	
	22	82 37 58.4	1 36 51.6	+0 42.9	+0 24 19.6	+3 42.1	9.8573193	0.2174386	0.2189194	
	26	89 5 38.8	1 36 58.6	1 21.1	0 46 56.7	5 35.7	9.8570891	0.2203392	0.2216970	
	30	95 33 46.5	1 37 5.2	1 55.3	1 8 59.4	5 24.9	9.8568873	0.2229927	0.2242272	
	Aug.	3	102 2 20.1	1 37 11.5	2 23.7	1 30 10.4	5 9.9	9.8567163	0.2253992	0.2265090
		7	108 31 17.6	1 37 17.2	2 44.7	1 50 13.2	4 50.8	9.8565785	0.2275572	0.2285444
11		115 0 36.5	1 37 22.2	+2 57.3	+2 8 52.0	+4 27.9	9.8564756	0.2294711	0.2303381	
15		121 30 13.6	1 37 26.3	3 0.8	2 25 52.2	4 1.6	9.8564089	0.2311464	0.2318969	
19		128 0 5.1	1 37 29.3	2 55.2	2 41 0.5	5 32.0	9.8563796	0.2325909	0.2332290	
23		134 30 6.7	1 37 31.2	2 40.5	2 54 4.7	5 59.7	9.8563876	0.2338114	0.2343383	
27		141 0 13.5	1 37 31.9	2 17.6	3 4 54.8	5 25.0	9.8564331	0.2348099	0.2352262	
31		147 30 20.5	1 37 31.3	+1 47.7	+3 13 22.3	+1 48.5	9.8565156	0.2355870	0.2358921	
Sept.		4	154 0 22.4	1 37 29.3	1 12.2	3 19 20.7	1 10.6	9.8566336	0.2361420	0.2363369
		8	160 30 13.3	1 37 25.8	+0 33.1	3 22 45.5	+0 31.8	9.8567861	0.2364771	0.2365636
	12	166 59 47.6	1 37 21.1	-0 7.6	3 23 34.4	-0 7.3	9.8569707	0.2365972	0.2365789	
	16	173 29 0.3	1 37 15.0	0 48.0	3 21 47.2	0 46.2	9.8571850	0.2365096	0.2363905	
	20	179 57 46.0	1 37 7.6	-1 25.9	+3 17 25.6	-1 24.4	9.8574265	0.2362220	0.2360045	
	24	186 26 0.0	1 36 59.2	1 59.3	3 10 33.7	2 1.4	9.8576917	0.2357387	0.2354244	
	28	192 53 38.5	1 36 49.9	2 26.7	3 1 17.2	2 56.6	9.8579773	0.2350613	0.2346495	
	Oct.	2	199 20 38.2	1 36 39.8	2 46.7	2 49 43.9	3 9.7	9.8582796	0.2341890	0.2336793
		6	205 46 56.4	1 36 29.2	2 58.2	2 36 3.2	3 40.2	9.8585948	0.2331212	0.2325148
		10	212 12 31.5	1 36 18.3	-3 0.7	+2 20 26.1	-4 7.8	9.8589188	0.2318606	0.2311596
14		218 37 22.8	1 36 7.3	2 54.3	2 3 4.9	4 32.2	9.8592476	0.2304125	0.2296205	
18		225 1 30.4	1 35 56.5	2 39.1	1 44 13.1	4 33.1	9.8595772	0.2287838	0.2279032	
22		231 24 55.4	1 35 46.0	2 16.1	1 24 5.2	5 10.2	9.8599033	0.2269791	0.2260115	
26		237 47 39.4	1 35 36.1	1 46.4	1 2 56.7	5 23.4	9.8602219	0.2249999	0.2239446	
30		244 9 45.1	1 35 26.9	-1 11.4	+0 41 3.4	-3 32.6	9.8605292	0.2228450	0.2217006	
Nov.		3	250 31 15.7	1 35 18.6	-0 33.1	+0 18 41.4	5 37.7	9.8608212	0.2205109	0.2192760
		7	256 52 14.8	1 35 11.2	+0 6.8	-0 3 52.5	5 38.6	9.8610946	0.2179962	0.2166714
	11	263 12 46.6	1 35 4.9	0 46.4	0 26 21.9	5 35.4	9.8613459	0.2153022	0.2138889	
	15	269 32 55.5	1 34 59.8	1 23.7	0 48 30.6	5 28.2	9.8615721	0.2124325	0.2109330	
	19	275 52 46.2	1 34 55.8	+1 56.8	-1 10 2.3	-5 17.0	9.8617705	0.2093909	0.2078061	
	23	282 12 23.3	1 34 53.0	2 24.3	1 30 42.0	5 2.1	9.8619388	0.2061782	0.2045068	
	27	288 31 51.4	1 34 51.3	2 44.7	1 50 14.5	4 43.6	9.8620749	0.2027909	0.2010299	
	Dec.	1	294 51 15.0	1 34 50.7	2 57.1	2 8 25.9	4 21.6	9.8621773	0.1992226	0.1973688
		5	301 10 38.1	1 34 51.1	3 1.0	2 25 3.3	5 56.6	9.8622448	0.1954678	0.1935188
		9	307 30 4.9	1 34 52.4	+2 56.0	-2 39 54.7	-3 28.7	9.8622765	0.1915217	0.1894764
13		313 49 38.8	1 34 54.6	2 42.5	2 52 49.4	2 58.3	9.8622719	0.1873836	0.1852426	
17		320 9 23.0	1 34 57.6	2 21.1	3 3 38.0	2 25.7	9.8622311	0.1830536	0.1808163	
21		326 29 20.2	1 35 1.1	1 52.8	3 12 12.7	1 51.4	9.8621549	0.1785309	0.1761953	
25		332 49 32.7	1 35 5.2	1 19.0	3 18 27.0	1 15.6	9.8620438	0.1738088	0.1713708	
29		339 10 2.5	1 35 9.7	+0 41.4	-3 22 16.3	-0 38.9	9.8618994	0.1688790	0.1663328	
33		345 30 51.1	1 35 14.7	+0 1.8	-3 23 37.3	-0 1.6	9.8617233	0.1637204	0.1610687	

MARS.									
GREENWICH MEAN NOON.									
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
Jan. 3	111 38 50.0	27 38.41	+43.7	+1 38 49.1	+24.40	0.2100192	9.8245771	9.8213561	
7	113 29 9.3	27 31.34	41.6	1 40 23.4	22.77	0.2109487	9.8186444	9.8164710	
11	115 19 1.1	27 24.60	39.3	1 41 51.2	21.13	0.2118423	9.8148594	9.8138296	
15	117 8 26.5	27 18.15	36.9	1 43 12.4	19.50	0.2126995	9.8133945	9.8135605	
19	118 57 26.7	27 11.98	34.3	1 44 27.2	17.86	0.2135196	9.8143300	9.8156977	
23	120 46 2.9	27 6.15	+31.7	+1 45 35.3	+16.21	0.2143026	9.8176531	9.8201816	
27	122 34 16.3	27 0.62	28.9	1 46 36.9	14.59	0.2150478	9.8232646	9.8268800	
31	124 22 8.1	26 55.37	26.0	1 47 32.0	12.96	0.2157546	9.8310028	9.8356060	
Feb. 4	126 9 39.7	26 50.44	23.0	1 48 20.6	11.35	0.2164227	9.8406599	9.8461327	
8	127 56 52.1	26 45.80	19.8	1 49 2.8	9.74	0.2170519	9.8519910	9.8582002	
12	129 43 46.5	26 41.45	+16.7	+1 49 38.5	+8.12	0.2176418	9.8647250	9.8715293	
16	131 30 24.1	26 37.40	13.5	1 50 7.8	6.52	0.2181920	9.8785777	9.8858376	
20	133 16 46.1	26 33.67	10.3	1 50 30.7	4.92	0.2187026	9.8932753	9.9008632	
24	135 2 53.9	26 30.24	7.0	1 50 47.2	3.32	0.2191728	9.9085730	9.9163810	
28	136 48 48.4	26 27.10	3.7	1 50 57.3	1.75	0.2196025	9.9242648	9.9322050	
Mar. 4	138 34 31.1	26 24.27	+0.4	+1 51 1.2	+0.19	0.2199918	9.9401827	9.9481820	
8	140 20 2.9	26 21.73	-2.9	1 50 58.8	-1.39	0.2203401	9.9561875	9.9641839	
12	142 5 25.3	26 19.49	6.2	1 50 50.1	2.95	0.2206477	9.9721576	9.9800954	
16	143 50 39.2	26 17.53	9.5	1 50 35.2	4.49	0.2209141	9.9879867	9.9958206	
20	145 35 45.9	26 15.89	12.7	1 50 14.2	6.04	0.2211393	0.0035887	0.0112831	
24	147 20 46.7	26 14.55	-15.8	+1 49 46.9	-7.59	0.2213231	0.0188992	0.0264320	
28	149 5 42.7	26 13.51	19.0	1 49 13.5	9.10	0.2214656	0.0338772	0.0412332	
Apr. 1	150 50 35.2	26 12.77	22.0	1 48 34.1	10.61	0.2215666	0.0484976	0.0556681	
5	152 35 25.3	26 12.31	24.9	1 47 48.6	12.12	0.2216261	0.0627429	0.0697203	
9	154 20 14.1	26 12.14	27.8	1 46 57.1	13.61	0.2216443	0.0765983	0.0833746	
13	156 5 2.8	26 12.27	-30.6	+1 45 59.7	-15.10	0.2216206	0.0900480	0.0966169	
17	157 49 52.7	26 12.71	33.3	1 44 56.3	16.57	0.2215553	0.1030802	0.1094381	
21	159 34 44.9	26 13.45	35.8	1 43 47.1	18.04	0.2214487	0.1156911	0.1218398	
25	161 19 40.7	26 14.47	38.2	1 42 32.0	19.49	0.2213005	0.1278853	0.1338292	
29	163 4 41.1	26 15.81	40.5	1 41 11.2	20.93	0.2211111	0.1396732	0.1454186	
May 3	164 49 47.6	26 17.46	-42.6	+1 39 44.6	-22.36	0.2208805	0.1510665	0.1566169	
7	166 35 1.2	26 19.37	44.5	1 38 12.3	23.78	0.2206086	0.1620717	0.1674311	
11	168 20 23.0	26 21.60	46.3	1 36 34.4	25.19	0.2202958	0.1726943	0.1778623	
15	170 5 54.4	26 24.17	47.8	1 34 50.8	26.59	0.2199420	0.1829360	0.1879158	
19	171 51 36.7	26 27.01	49.3	1 33 1.7	27.97	0.2195474	0.1928034	0.1976001	
23	173 37 30.9	26 30.16	-50.5	+1 31 7.1	-29.34	0.2191122	0.2023076	0.2069284	
27	175 23 38.4	26 33.64	51.6	1 29 7.0	30.69	0.2186369	0.2114636	0.2159149	
31	177 10 0.4	26 37.36	52.6	1 27 1.6	32.02	0.2181213	0.2202845	0.2245731	
June 4	178 56 37.7	26 41.35	53.2	1 24 50.8	33.35	0.2175659	0.2287811	0.2329101	
8	180 43 31.6	26 45.70	53.6	1 22 34.8	34.65	0.2169710	0.2369600	0.2409313	
12	182 30 43.7	26 50.36	-53.9	+1 20 13.6	-35.95	0.2163368	0.2448249	0.2486413	
16	184 18 14.9	26 55.30	53.9	1 17 47.2	37.21	0.2156639	0.2523815	0.2560476	
20	186 6 6.5	27 0.56	53.7	1 15 15.9	38.46	0.2149525	0.2596403	0.2631614	
24	187 54 19.8	27 6.14	53.3	1 12 39.5	39.70	0.2142029	0.2666126	0.2699950	
28	189 42 56.0	27 12.00	52.8	1 9 58.3	40.91	0.2134155	0.2733107	0.2765602	
July 2	191 31 56.2	27 18.14	-51.9	+1 7 12.2	-42.11	0.2125907	0.2797441	0.2828636	
6	193 21 21.5	27 24.59	-50.9	+1 4 21.5	-43.28	0.2117293	0.2859186	0.2889096	

## MARS.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
July	2 191° 31' 56.2	27 18.14	-51.9	+1° 7' 12.2	-42.11	0.2125907	0.2797441	0.2828636
	6 193 21 21.5	27 24.59	50.9	1 4 21.4	43.28	0.2117293	0.2859186	0.2889096
	10 195 11 13.3	27 31.35	49.6	1 1 26.0	44.43	0.2108318	0.2918370	0.2947011
	14 197 1 32.7	27 38.44	48.2	0 58 26.0	45.55	0.2098984	0.2975031	0.3002436
	18 198 52 21.2	27 45.80	46.6	0 55 21.6	46.63	0.2089302	0.3029238	0.3055455
	22 200 43 39.5	27 53.43	-44.8	+0 52 13.0	-47.69	0.2079276	0.3081094	0.3106171
	26 202 35 29.0	28 1.39	42.7	0 49 0.1	48.73	0.2068909	0.3130693	0.3154676
	30 204 27 51.0	28 9.67	40.4	0 45 43.1	49.73	0.2058215	0.3178124	0.3201038
	Aug. 3 206 20 46.7	28 18.22	38.1	0 42 22.3	50.69	0.2047196	0.3223426	0.3245284
	7 208 14 17.0	28 27.07	35.4	0 38 57.6	51.64	0.2035861	0.3266618	0.3287429
	11 210 8 23.5	28 36.21	-32.7	+0 35 29.2	-32.52	0.2024222	0.3307724	0.3327510
	15 212 3 7.1	28 45.62	29.7	0 31 57.4	53.37	0.2012287	0.3346795	0.3365589
	19 213 58 28.9	28 55.31	26.6	0 28 22.2	54.19	0.2000063	0.3383906	0.3401751
	23 215 54 30.0	29 5.30	23.4	0 24 43.9	54.95	0.1987561	0.3419140	0.3436081
	27 217 51 11.7	29 15.55	20.0	0 21 2.6	55.68	0.1974793	0.3452578	0.3468636
	31 219 48 35.0	29 26.10	-16.6	+0 17 18.5	-56.35	0.1961771	0.3484256	0.3499438
	Sept. 4 221 46 40.9	29 36.90	13.0	0 13 31.8	56.96	0.1948506	0.3514183	0.3528497
	8 223 45 30.6	29 47.96	9.5	0 9 42.8	57.52	0.1935010	0.3542378	0.3555834
	12 225 45 5.0	29 59.29	5.7	0 5 51.6	58.04	0.1921294	0.3568868	0.3581492
	16 227 45 25.2	30 10.85	-2.0	+0 1 58.5	58.48	0.1907373	0.3593717	0.3605550
	20 229 46 32.1	30 22.66	+1.9	-0 1 56.2	-58.86	0.1893262	0.3617004	0.3628083
	24 231 48 26.8	30 34.72	5.7	0 5 52.4	59.19	0.1878976	0.3638793	0.3649144
	28 233 51 10.2	30 46.97	9.5	0 9 49.7	59.41	0.1864532	0.3659131	0.3668760
	Oct. 2 235 54 42.9	30 59.41	13.2	0 13 47.7	59.58	0.1849945	0.3678029	0.3686937
	6 237 59 5.8	31 12.07	17.0	0 17 46.3	59.69	0.1835231	0.3695491	0.3703690
	10 240 4 19.8	31 24.94	+20.7	-0 21 45.2	-59.70	0.1820410	0.3711542	0.3719053
	14 242 10 25.5	31 37.94	24.3	0 25 43.9	59.62	0.1805500	0.3726233	0.3733093
	18 244 17 23.5	31 51.10	27.8	0 29 42.2	59.47	0.1790518	0.3739639	0.3745883
	22 246 25 14.5	32 4.44	31.2	0 33 39.7	59.23	0.1775484	0.3751825	0.3757476
	26 248 33 59.2	32 17.89	34.3	0 37 36.0	58.89	0.1760420	0.3762837	0.3767909
	30 250 43 37.7	32 31.43	+37.4	-0 41 30.8	-58.44	0.1745349	0.3772694	0.3777189
	Nov. 3 252 54 10.7	32 45.06	40.2	0 45 23.5	57.90	0.1730291	0.3781398	0.3785324
	7 255 5 38.3	32 58.75	42.8	0 49 14.0	57.26	0.1715269	0.3788973	0.3792349
	11 257 18 0.8	33 12.51	45.2	0 53 1.7	56.51	0.1700306	0.3795460	0.3798315
	15 259 31 18.4	33 26.29	47.3	0 56 46.1	55.66	0.1685426	0.3800927	0.3803299
	19 261 45 31.1	33 40.03	+49.0	-1 0 27.0	-54.71	0.1670653	0.3805444	0.3807364
	23 264 0 38.6	33 53.74	50.7	1 4 3.8	53.62	0.1656012	0.3809063	0.3810549
	27 266 16 41.0	34 7.44	52.1	1 7 36.0	52.42	0.1641530	0.3811815	0.3812863
	Dec. 1 268 33 38.0	34 21.04	53.0	1 11 3.2	51.12	0.1627232	0.3813698	0.3814318
	5 270 51 29.2	34 34.55	53.6	1 14 25.0	49.70	0.1613145	0.3814730	0.3814938
	9 273 10 14.2	34 47.92	+53.9	-1 17 40.8	-48.17	0.1599296	0.3814950	0.3814773
	13 275 29 52.4	35 1.11	53.8	1 20 50.2	46.49	0.1585710	0.3814420	0.3813896
	17 277 50 22.8	35 14.08	53.4	1 23 52.7	44.70	0.1572415	0.3813211	0.3812369
	21 280 11 44.8	35 26.86	52.6	1 26 47.8	42.80	0.1559437	0.3811381	0.3810244
	25 282 33 57.3	35 39.36	51.3	1 29 35.1	40.79	0.1546805	0.3808958	0.3807529
	29 284 56 59.1	35 51.53	+49.8	-1 32 14.1	-38.65	0.1534547	0.3805953	0.3804229
	33 287 20 49.1	36 3.37	+47.9	-1 34 44.3	-36.40	0.1522689	0.3802368	

JUPITER.									
GREENWICH MEAN NOON.									
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
Jan. 3	206° 48' 21.6	4 32.73	—15.3	+1 14 59.8	—1.86	0.7361906	0.7606080	0.7583355	
7	207 6 32.6	4 32.76	15.6	1 14 52.3	1.89	0.7361611	0.7560231	0.7536719	
11	207 24 43.7	4 32.80	15.8	1 14 44.6	1.92	0.7361310	0.7512839	0.7488608	
15	207 42 55.0	4 32.84	16.0	1 14 36.9	1.96	0.7361003	0.7464047	0.7439178	
19	208 1 6.4	4 32.88	16.3	1 14 29.0	1.99	0.7360689	0.7414020	0.7388592	
23	208 19 18.0	4 32.92	—16.5	+1 14 20.9	—2.02	0.7360370	0.7362917	0.7337017	
27	208 37 29.8	4 32.96	16.7	1 14 12.8	2.05	0.7360045	0.7310912	0.7284623	
31	208 55 41.7	4 33.00	16.9	1 14 4.5	2.08	0.7359714	0.7258176	0.7231593	
Feb. 4	209 13 53.8	4 33.04	17.1	1 13 56.1	2.11	0.7359377	0.7204902	0.7178129	
8	209 32 6.0	4 33.08	17.4	1 13 47.6	2.15	0.7359034	0.7151308	0.7124469	
12	209 50 18.5	4 33.13	—17.6	+1 13 39.0	—2.18	0.7358685	0.7097650	0.7070887	
16	210 8 31.1	4 33.17	17.8	1 13 30.2	2.21	0.7358330	0.7044212	0.7017661	
20	210 26 43.9	4 33.22	18.0	1 13 21.3	2.24	0.7357969	0.6991270	0.6965073	
24	210 44 56.8	4 33.27	18.2	1 13 12.3	2.27	0.7357603	0.6939108	0.6913410	
28	211 3 10.0	4 33.31	18.4	1 13 3.1	2.30	0.7357231	0.6888016	0.6862965	
Mar. 4	211 21 23.3	4 33.36	—18.6	+1 12 53.8	—2.33	0.7356852	0.6838296	0.6814050	
8	211 39 36.8	4 33.41	18.8	1 12 44.4	2.37	0.7356467	0.6790272	0.6767006	
12	211 57 50.6	4 33.46	19.0	1 12 34.9	2.40	0.7356076	0.6744229	0.6722191	
16	212 16 4.5	4 33.51	19.2	1 12 25.3	2.43	0.7355679	0.6700727	0.6679953	
20	212 34 18.6	4 33.56	19.4	1 12 15.5	2.46	0.7355276	0.6659903	0.6640620	
24	212 52 32.9	4 33.61	—19.6	+1 12 5.6	—2.49	0.7354867	0.6622141	0.6604500	
28	213 10 47.5	4 33.66	19.8	1 11 55.6	2.52	0.7354452	0.6587733	0.6571875	
Apr. 1	213 29 2.2	4 33.71	20.0	1 11 45.4	2.55	0.7354031	0.6556962	0.6543028	
5	213 47 17.2	4 33.76	20.2	1 11 35.2	2.58	0.7353605	0.6530106	0.6518230	
9	214 5 32.3	4 33.81	20.4	1 11 24.8	2.61	0.7353173	0.6507429	0.6497727	
13	214 23 47.7	4 33.87	—20.6	+1 11 14.3	—2.64	0.7352735	0.6489148	0.6481715	
17	214 42 3.3	4 33.93	20.7	1 11 3.6	2.67	0.7352291	0.6475436	0.6470331	
21	215 0 19.1	4 33.98	20.9	1 10 52.9	2.70	0.7351841	0.6466400	0.6463651	
25	215 18 35.2	4 34.04	21.1	1 10 42.0	2.73	0.7351386	0.6462085	0.6461707	
29	215 36 51.4	4 34.10	21.3	1 10 31.0	2.76	0.7350925	0.6462516	0.6464507	
May 3	215 55 7.9	4 34.16	—21.5	+1 10 19.9	—2.79	0.7350458	0.6467672	0.6472008	
7	216 13 24.7	4 34.22	21.7	1 10 8.7	2.83	0.7349985	0.6477498	0.6484133	
11	216 31 41.7	4 34.27	21.8	1 9 57.3	2.86	0.7349506	0.6491893	0.6500756	
15	216 49 58.9	4 34.33	22.0	1 9 45.8	2.89	0.7349022	0.6510696	0.6521681	
19	217 8 16.4	4 34.40	22.2	1 9 34.2	2.92	0.7348532	0.6533678	0.6546658	
23	217 26 34.1	4 34.46	—22.3	+1 9 22.5	—2.95	0.7348036	0.6560585	0.6575426	
27	217 44 52.0	4 34.52	22.5	1 9 10.6	2.98	0.7347534	0.6591148	0.6607718	
31	218 3 10.2	4 34.59	22.7	1 8 58.6	3.00	0.7347026	0.6625098	0.6643255	
June 4	218 21 28.7	4 34.65	22.8	1 8 46.6	3.03	0.7346513	0.6662153	0.6681750	
8	218 39 47.4	4 34.71	23.0	1 8 34.4	3.06	0.7345994	0.6702006	0.6722882	
12	218 58 6.4	4 34.78	—23.1	+1 8 22.0	—3.09	0.7345469	0.6744334	0.6766320	
16	219 16 25.7	4 34.85	23.3	1 8 9.6	3.13	0.7344938	0.6788799	0.6811725	
20	219 34 45.2	4 34.92	23.4	1 7 57.0	3.16	0.7344402	0.6835063	0.6858774	
24	219 53 5.0	4 34.98	23.6	1 7 44.3	3.19	0.7343860	0.6882822	0.6907170	
28	220 11 25.1	4 35.05	23.7	1 7 31.5	3.22	0.7343312	0.6931785	0.6956635	
July 2	220 29 45.4	4 35.12	—23.8	+1 7 18.6	—3.24	0.7342759	0.6981686	0.7006905	
6	220 48 6.0	4 35.19	—24.0	+1 7 5.6	—3.27	0.7342200	0.7032259	0.7057712	

## JUPITER.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—			
							At Date.	At Intermediate Date.		
July	2	220 29 45.4	4 35.12	-23.8	+1 7 18.6	-3.24	0.7342759	0.6981686	0.7006905	
	6	220 48 6.0	4 35.19	24.0	1 7 5.6	3.27	0.7342200	0.7032259	0.7057712	
	10	221 6 26.9	4 35.26	24.1	1 6 52.4	3.30	0.7341636	0.7083233	0.7108789	
	14	221 24 48.1	4 35.33	24.2	1 6 39.1	3.33	0.7341067	0.7134349	0.7159882	
	18	221 43 9.6	4 35.40	24.3	1 6 25.7	3.36	0.7340492	0.7185364	0.7210768	
	22	222 1 31.4	4 35.48	-24.5	+1 6 12.2	-3.39	0.7339911	0.7236072	0.7261249	
	26	222 19 53.4	4 35.55	24.6	1 5 58.6	3.42	0.7339325	0.7286284	0.7311159	
	30	222 38 15.8	4 35.62	24.7	1 5 44.9	3.45	0.7338733	0.7335850	0.7360336	
	Aug.	3	222 56 38.4	4 35.70	24.8	1 5 31.0	3.48	0.7338135	0.7384597	0.7408612
		7	223 15 1.4	4 35.78	24.9	1 5 17.0	3.51	0.7337531	0.7432364	0.7455832
11		223 33 24.6	4 35.86	-25.0	+1 5 2.9	-3.54	0.7336922	0.7478999	0.7501847	
15		223 51 48.2	4 35.93	25.1	1 4 48.7	3.57	0.7336308	0.7524363	0.7546534	
19		224 10 12.1	4 36.01	25.2	1 4 34.4	3.59	0.7335689	0.7568347	0.7589790	
23		224 28 36.3	4 36.09	25.3	1 4 20.0	3.62	0.7335065	0.7610854	0.7631532	
27		224 47 0.8	4 36.17	25.4	1 4 5.4	3.65	0.7334435	0.7651811	0.7671681	
31		225 5 25.7	4 36.25	-25.5	+1 3 50.7	-3.68	0.7333799	0.7691128	0.7710143	
Sept.		4	225 23 50.8	4 36.33	25.6	1 3 36.0	3.71	0.7333158	0.7728714	0.7746831
		8	225 42 16.3	4 36.41	25.7	1 3 21.1	3.74	0.7332512	0.7764486	0.7781667
	12	226 0 42.1	4 36.49	25.8	1 3 6.1	3.77	0.7331860	0.7798369	0.7814585	
	16	226 19 8.3	4 36.57	25.8	1 2 50.9	3.79	0.7331202	0.7830310	0.7845538	
	20	226 37 34.7	4 36.66	-25.9	+1 2 35.7	-3.82	0.7330539	0.7860265	0.7874488	
	24	226 56 1.6	4 36.75	26.0	1 2 20.4	3.85	0.7329871	0.7888202	0.7901401	
	28	227 14 28.7	4 36.84	26.0	1 2 4.9	3.88	0.7329198	0.7914078	0.7926228	
	Oct.	2	227 32 56.2	4 36.92	26.1	1 1 49.3	3.91	0.7328520	0.7937842	0.7948914
		6	227 51 24.1	4 37.00	26.2	1 1 33.7	3.93	0.7327836	0.7959441	0.7969417
		10	228 9 52.3	4 37.09	-26.2	+1 1 17.9	-3.96	0.7327147	0.7978838	0.7987702
14		228 28 20.8	4 37.18	26.3	1 1 2.0	3.99	0.7326453	0.7996007	0.8003749	
18		228 46 49.7	4 37.27	26.4	1 0 46.0	4.02	0.7325753	0.8010928	0.8017546	
22		229 5 19.0	4 37.36	26.4	1 0 29.8	4.05	0.7325048	0.8023599	0.8029082	
26		229 23 48.6	4 37.45	26.5	1 0 13.6	4.07	0.7324338	0.8033993	0.8038329	
30		229 42 18.6	4 37.54	-26.5	+0 59 57.2	-4.10	0.7323623	0.8042084	0.8045253	
Nov.		3	230 0 48.9	4 37.63	26.6	0 59 40.8	4.13	0.7322903	0.8047835	0.8049828
		7	230 19 19.6	4 37.72	26.6	0 59 24.2	4.15	0.7322177	0.8051232	0.8052044
	11	230 37 50.7	4 37.81	26.7	0 59 7.5	4.18	0.7321446	0.8052266	0.8051897	
	15	230 56 22.1	4 37.91	26.7	0 58 50.8	4.21	0.7320710	0.8050939	0.8049393	
	19	231 14 54.0	4 38.00	-26.8	+0 58 33.9	-4.24	0.7319969	0.8047258	0.8044533	
	23	231 33 26.2	4 38.09	26.8	0 58 16.9	4.26	0.7319223	0.8041216	0.8037308	
	27	231 51 58.8	4 38.19	26.8	0 57 59.8	4.29	0.7318472	0.8032805	0.8027705	
	Dec.	1	232 10 31.7	4 38.29	26.8	0 57 42.6	4.31	0.7317715	0.8022009	0.8015714
		5	232 29 5.1	4 38.39	26.8	0 57 25.3	4.34	0.7316953	0.8008825	0.8001342
		9	232 47 38.8	4 38.49	-26.9	+0 57 7.8	-4.37	0.7316186	0.7993270	0.7984610
13		233 6 13.0	4 38.58	26.9	0 56 50.3	4.40	0.7315414	0.7975367	0.7965544	
17		233 24 47.5	4 38.68	26.9	0 56 32.7	4.42	0.7314638	0.7955142	0.7944165	
21		233 43 22.4	4 38.78	26.9	0 56 14.9	4.45	0.7313857	0.7932613	0.7920488	
25		234 1 57.7	4 38.88	26.9	0 55 57.1	4.47	0.7313071	0.7907791	0.7894524	
29		234 20 33.5	4 38.98	-26.9	+0 55 39.1	-4.50	0.7312280	0.7880691	0.7866294	
33		234 39 9.6	4 39.08	-26.9	+0 55 21.0	-4.53	0.7311484	0.7851339		

SATURN.										
GREENWICH MEAN NOON.										
Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
									At Date.	At Intermediate Date.
Jan.	3	255 35 12.2	1 48.79	-1 34.1	+1 30 23.7	-3.76	1.0019472	1.0385108	1.0379298	
	7	255 42 27.3	1 48.79	1 34.0	1 30 8.6	3.77	1.0019626	1.0373104	1.0366526	
	11	255 49 42.5	1 48.78	1 33.9	1 29 53.5	3.77	1.0019779	1.0359571	1.0352243	
	15	255 56 57.6	1 48.78	1 33.7	1 29 38.4	3.78	1.0019931	1.0344548	1.0336494	
	19	256 4 12.7	1 48.77	1 33.6	1 29 23.3	3.78	1.0020082	1.0328086	1.0319331	
	23	256 11 27.8	1 48.76	-1 33.5	+1 29 8.1	-3.79	1.0020232	1.0310235	1.0300809	
	27	256 18 42.8	1 48.75	1 33.4	1 28 52.9	3.80	1.0020381	1.0291057	1.0280986	
	31	256 25 57.8	1 48.75	1 33.3	1 28 37.7	3.80	1.0020528	1.0270603	1.0259914	
	Feb.	4	256 33 12.8	1 48.74	1 33.1	1 28 22.5	3.81	1.0020674	1.0248928	1.0237654
		8	256 40 27.7	1 48.73	1 33.0	1 28 7.3	3.82	1.0020819	1.0226102	1.0214279
12		256 47 42.6	1 48.72	-1 32.9	+1 27 52.0	-3.82	1.0020963	1.0202197	1.0189868	
16		256 54 57.5	1 48.72	1 32.8	1 27 36.7	3.82	1.0021106	1.0177303	1.0164515	
20		257 2 12.4	1 48.71	1 32.6	1 27 21.3	3.83	1.0021248	1.0151516	1.0138320	
24		257 9 27.2	1 48.71	1 32.5	1 27 6.0	3.84	1.0021389	1.0124938	1.0111378	
28		257 16 42.0	1 48.70	1 32.3	1 26 50.7	3.84	1.0021529	1.0097655	1.0083780	
Mar.		4	257 23 56.8	1 48.69	-1 32.2	+1 26 35.3	-3.85	1.0021668	1.0069768	1.0055631
	8	257 31 11.6	1 48.69	1 32.1	1 26 19.9	3.85	1.0021806	1.0041385	1.0027045	
	12	257 38 26.3	1 48.68	1 31.9	1 26 4.5	3.86	1.0021943	1.0012627	0.9998148	
	16	257 45 41.0	1 48.67	1 31.8	1 25 49.0	3.86	1.0022079	0.9983624	0.9969073	
	20	257 52 55.7	1 48.66	1 31.6	1 25 33.6	3.87	1.0022213	0.9954512	0.9939960	
	24	258 0 10.3	1 48.66	-1 31.5	+1 25 18.1	-3.88	1.0022346	0.9925429	0.9910939	
	28	258 7 24.9	1 48.65	1 31.4	1 25 2.6	3.88	1.0022478	0.9896506	0.9882145	
	Apr.	1	258 14 39.5	1 48.64	1 31.2	1 24 47.0	3.88	1.0022609	0.9867874	0.9853712
		5	258 21 54.1	1 48.64	1 31.1	1 24 31.5	3.89	1.0022739	0.9839677	0.9825787
		9	258 29 8.6	1 48.63	1 30.9	1 24 15.9	3.89	1.0022867	0.9812063	0.9798523
13		258 36 23.1	1 48.62	-1 30.8	+1 24 0.3	-3.90	1.0022994	0.9785189	0.9772082	
17		258 43 37.6	1 48.62	1 30.6	1 23 44.7	3.91	1.0023120	0.9759216	0.9746614	
21		258 50 52.0	1 48.61	1 30.4	1 23 29.1	3.91	1.0023245	0.9734291	0.9722268	
25		258 58 6.5	1 48.61	1 30.3	1 23 13.4	3.92	1.0023369	0.9710556	0.9699174	
May	29	259 5 20.9	1 48.60	1 30.2	1 22 57.7	3.92	1.0023492	0.9688138	0.9677467	
	3	259 12 35.3	1 48.59	-1 30.0	+1 22 42.0	-3.93	1.0023615	0.9667178	0.9657286	
	7	259 19 49.6	1 48.59	1 29.8	1 22 26.3	3.93	1.0023737	0.9647810	0.9638768	
	11	259 27 4.0	1 48.58	1 29.7	1 22 10.5	3.94	1.0023857	0.9630173	0.9622042	
	15	259 34 18.3	1 48.57	1 29.5	1 21 54.7	3.95	1.0023976	0.9614387	0.9607220	
	19	259 41 32.6	1 48.57	1 29.4	1 21 38.9	3.95	1.0024094	0.9600553	0.9594397	
	23	259 48 46.8	1 48.56	-1 29.2	+1 21 23.1	-3.96	1.0024210	0.9588760	0.9583650	
	27	259 56 1.0	1 48.56	1 29.0	1 21 7.3	3.96	1.0024325	0.9579076	0.9575045	
	31	260 3 15.2	1 48.55	1 28.8	1 20 51.4	3.97	1.0024439	0.9571565	0.9568644	
	June	4	260 10 29.4	1 48.55	1 28.7	1 20 35.6	3.97	1.0024552	0.9566287	0.9564502
8		260 17 43.6	1 48.54	1 28.5	1 20 19.7	3.97	1.0024665	0.9563290	0.9562656	
12		260 24 57.8	1 48.54	-1 28.3	+1 20 3.8	-3.98	1.0024777	0.9562597	0.9563115	
16		260 32 11.9	1 48.53	1 28.1	1 19 47.9	3.98	1.0024887	0.9564206	0.9565867	
20		260 39 26.0	1 48.52	1 28.0	1 19 31.9	3.99	1.0024996	0.9568092	0.9570878	
24		260 46 40.1	1 48.52	1 27.8	1 19 15.9	4.00	1.0025104	0.9574218	0.9578107	
28		260 53 54.1	1 48.51	1 27.7	1 18 59.9	4.00	1.0025210	0.9582538	0.9587505	
July	2	261 1 8.1	1 48.50	-1 27.5	+1 18 43.9	-4.01	1.0025315	0.9593001	0.9599020	
	6	261 8 22.1	1 48.50	-1 27.3	+1 18 27.9	-4.01	1.0025419	0.9605548	0.9612572	

## SATURN.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
July	2 261 1 8.1	1 48.50	-1 27.5	+1 18 43.9	-4.01	1.0025315	0.9593001	0.9599020
	6 261 8 22.1	1 48.50	1 27.3	1 18 27.9	4.01	1.0025419	0.9605548	0.9612572
	10 261 15 36.1	1 48.49	1 27.1	1 18 11.8	4.01	1.0025522	0.9620082	0.9628067
	14 261 22 50.1	1 48.49	1 26.9	1 17 55.7	4.02	1.0025624	0.9636510	0.9645393
	18 261 30 4.0	1 48.48	1 26.7	1 17 39.7	4.02	1.0025725	0.9654703	0.9664427
	22 261 37 18.0	1 48.48	-1 26.5	+1 17 23.6	-4.03	1.0025826	0.9674546	0.9685043
Aug.	26 261 44 31.9	1 48.47	1 26.3	1 17 7.5	4.03	1.0025925	0.9695903	0.9707112
	30 261 51 45.7	1 48.47	1 26.1	1 16 51.3	4.04	1.0026023	0.9718653	0.9730512
	3 261 58 59.6	1 48.46	1 25.9	1 16 35.1	4.05	1.0026120	0.9742670	0.9755110
	7 262 6 13.4	1 48.46	1 25.7	1 16 18.9	4.05	1.0026215	0.9767812	0.9780758
	11 262 13 27.2	1 48.45	-1 25.6	+1 16 2.7	-4.06	1.0026309	0.9793928	0.9807306
	15 262 20 41.0	1 48.45	1 25.4	1 15 46.5	4.06	1.0026402	0.9820870	0.9834601
	19 262 27 54.8	1 48.44	1 25.2	1 15 30.1	4.06	1.0026494	0.9848481	0.9862494
	23 262 35 8.6	1 48.44	1 25.0	1 15 13.9	4.07	1.0026585	0.9876623	0.9890853
	27 262 42 22.3	1 48.43	1 24.8	1 14 57.7	4.07	1.0026675	0.9905167	0.9919547
	31 262 49 36.1	1 48.43	-1 24.6	+1 14 41.4	-4.07	1.0026763	0.9933978	0.9948443
Sept.	4 262 56 49.8	1 48.42	1 24.4	1 14 25.1	4.08	1.0026851	0.9962925	0.9977407
	8 263 4 3.5	1 48.42	1 24.2	1 14 8.7	4.09	1.0026938	0.9991870	1.0006296
	12 263 11 17.1	1 48.41	1 23.9	1 13 52.3	4.10	1.0027024	1.0020672	1.0034982
	16 263 18 30.8	1 48.41	1 23.7	1 13 35.9	4.10	1.0027109	1.0049212	1.0063346
	20 263 25 44.4	1 48.41	-1 23.5	+1 13 19.5	-4.11	1.0027192	1.0077372	1.0091279
	24 263 32 58.0	1 48.40	1 23.3	1 13 3.1	4.11	1.0027274	1.0105054	1.0118682
Oct.	28 263 40 11.6	1 48.40	1 23.0	1 12 46.6	4.11	1.0027355	1.0132153	1.0145454
	2 263 47 25.2	1 48.40	1 22.8	1 12 30.2	4.12	1.0027435	1.0158572	1.0171492
	6 263 54 38.8	1 48.39	1 22.6	1 12 13.7	4.12	1.0027513	1.0184203	1.0196695
	10 264 1 52.4	1 48.39	-1 22.4	+1 11 57.2	-4.12	1.0027590	1.0208956	1.0220973
	14 264 9 5.9	1 48.38	1 22.2	1 11 40.7	4.13	1.0027666	1.0232737	1.0244239
	18 264 16 19.4	1 48.38	1 21.9	1 11 24.2	4.13	1.0027742	1.0255473	1.0266432
Nov.	22 264 23 32.9	1 48.38	1 21.7	1 11 7.6	4.14	1.0027817	1.0277106	1.0287484
	26 264 30 46.4	1 48.37	1 21.5	1 10 51.0	4.14	1.0027891	1.0297561	1.0307330
	30 264 37 59.9	1 48.37	-1 21.3	+1 10 34.4	-4.15	1.0027964	1.0316782	1.0325907
	3 264 45 13.4	1 48.37	1 21.1	1 10 17.8	4.15	1.0028035	1.0334698	1.0343147
	7 264 52 26.8	1 48.36	1 20.8	1 10 1.2	4.16	1.0028105	1.0351249	1.0358996
	11 264 59 40.3	1 48.36	1 20.6	1 9 44.6	4.16	1.0028174	1.0366384	1.0373410
Dec.	15 265 6 53.7	1 48.35	1 20.3	1 9 27.9	4.16	1.0028242	1.0380068	1.0386354
	19 265 14 7.1	1 48.35	-1 20.1	+1 9 11.3	-4.17	1.0028309	1.0392265	1.0397797
	23 265 21 20.5	1 48.35	1 19.9	1 8 54.6	4.17	1.0028375	1.0402947	1.0407711
	27 265 28 33.8	1 48.34	1 19.6	1 8 37.9	4.18	1.0028440	1.0412085	1.0416061
	1 265 35 47.2	1 48.34	1 19.4	1 8 21.1	4.19	1.0028504	1.0419638	1.0422811
	5 265 43 0.6	1 48.34	1 19.1	1 8 4.4	4.19	1.0028566	1.0425580	1.0427941
	9 265 50 13.9	1 48.33	-1 18.9	+1 7 47.6	-4.20	1.0028627	1.0429895	1.0431437
	13 265 57 27.2	1 48.33	1 18.7	1 7 30.8	4.20	1.0028687	1.0433257	1.0433299
	17 266 4 40.5	1 48.33	1 18.4	1 7 14.0	4.20	1.0028746	1.0433617	1.0433526
	21 266 11 53.8	1 48.32	1 18.2	1 6 57.2	4.20	1.0028804	1.0433026	1.0432115
	25 266 19 7.1	1 48.32	1 17.9	1 6 40.4	4.21	1.0028861	1.0430794	1.0429063
	29 266 26 20.4	1 48.32	-1 17.7	+1 6 23.5	-4.21	1.0028916	1.0426921	1.0424369
	33 266 33 33.7	1 48.31	-1 17.5	+1 6 6.7	-4.22	1.0028970	1.0421406	



URANUS.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth.	
							At Date.	At Intermediate Date.
Jan. 7	244 19 43.8	43.60	-3.0	+0 7 26.5	-0.58	1.2770881	1.2936120	1.2925941
15	244 25 32.6	43.59	2.9	0 7 21.9	0.58	1.2771217	1.2915008	1.2903366
23	244 31 21.3	43.58	2.9	0 7 17.3	0.58	1.2771554	1.2891072	1.2878171
31	244 37 9.9	43.58	2.9	0 7 12.6	0.58	1.2771890	1.2864720	1.2850764
Feb. 8	244 42 58.5	43.57	2.9	0 7 8.0	0.58	1.2772226	1.2836368	1.2821592
16	244 48 47.0	43.57	-2.8	+0 7 3.4	-0.58	1.2772562	1.2806510	1.2791193
24	244 54 35.5	43.56	2.8	0 6 58.7	0.58	1.2772899	1.2775710	1.2760131
Mar. 4	245 0 24.0	43.55	2.8	0 6 54.1	0.58	1.2773235	1.2744528	1.2728972
12	245 6 12.4	43.55	2.7	0 6 49.4	0.58	1.2773571	1.2713541	1.2698320
20	245 12 0.7	43.54	2.7	0 6 44.8	0.58	1.2773908	1.2683385	1.2668819
28	245 17 49.0	43.54	-2.7	+0 6 40.2	-0.58	1.2774244	1.2654688	1.2641061
Apr. 5	245 23 37.3	43.53	2.6	0 6 35.5	0.58	1.2774580	1.2628010	1.2615612
13	245 29 25.5	43.52	2.6	0 6 30.9	0.58	1.2774917	1.2603936	1.2593050
21	245 35 13.6	43.51	2.6	0 6 26.2	0.58	1.2775254	1.2583012	1.2573871
29	245 41 1.7	43.51	2.6	0 6 21.6	0.58	1.2775590	1.2565679	1.2558480
May 7	245 46 49.7	43.50	-2.5	+0 6 16.9	-0.58	1.2775927	1.2552313	1.2547222
15	245 52 37.7	43.50	2.5	0 6 12.3	0.58	1.2776264	1.2543238	1.2540381
23	245 58 25.6	43.49	2.5	0 6 7.6	0.58	1.2776601	1.2538657	1.2538077
31	246 4 13.5	43.48	2.4	0 6 3.0	0.58	1.2776938	1.2538640	1.2540347
June 8	246 10 1.4	43.48	2.4	0 5 58.3	0.58	1.2777274	1.2543188	1.2547150
16	246 15 49.1	43.47	-2.4	+0 5 53.7	-0.58	1.2777611	1.2552206	1.2558319
24	246 21 36.8	43.46	2.3	0 5 49.1	0.58	1.2777948	1.2565452	1.2573564
July 2	246 27 24.5	43.46	2.3	0 5 44.4	0.58	1.2778284	1.2582615	1.2592556
10	246 33 12.2	43.45	2.3	0 5 39.8	0.58	1.2778621	1.2603336	1.2614893
18	246 38 59.7	43.44	2.2	0 5 35.1	0.58	1.2778957	1.2627161	1.2640067
26	246 44 47.3	43.44	-2.2	+0 5 30.5	-0.58	1.2779294	1.2653552	1.2667553
Aug. 3	246 50 34.7	43.43	2.2	0 5 25.8	0.58	1.2779630	1.2682001	1.2696826
11	246 56 22.1	43.43	2.1	0 5 21.2	0.58	1.2779967	1.2711952	1.2727304
19	247 2 9.5	43.42	2.1	0 5 16.5	0.58	1.2780303	1.2742806	1.2758392
27	247 7 56.8	43.41	2.1	0 5 11.8	0.58	1.2780638	1.2773996	1.2789553
Sept. 4	247 13 44.1	43.41	-2.0	+0 5 7.2	-0.58	1.2780974	1.2804991	1.2820242
12	247 19 31.3	43.40	2.0	0 5 2.5	0.58	1.2781310	1.2835237	1.2849913
20	247 25 18.5	43.39	2.0	0 4 57.9	0.58	1.2781646	1.2864210	1.2878078
28	247 31 5.6	43.39	2.0	0 4 53.2	0.58	1.2781981	1.2891462	1.2904309
Oct. 6	247 36 52.7	43.38	1.9	0 4 48.6	0.58	1.2782317	1.2916560	1.2928162
14	247 42 39.7	43.37	-1.9	+0 4 43.9	-0.58	1.2782652	1.2939078	1.2949264
22	247 48 26.7	43.37	1.9	0 4 39.3	0.58	1.2782988	1.2958686	1.2967312
30	247 54 13.6	43.36	1.8	0 4 34.6	0.58	1.2783323	1.2975104	1.2982028
Nov. 7	248 0 0.5	43.36	1.8	0 4 30.0	0.58	1.2783659	1.2988062	1.2993171
15	248 5 47.3	43.35	1.8	0 4 25.3	0.58	1.2783993	1.2997346	1.3000573
23	248 11 34.0	43.34	-1.8	+0 4 20.7	-0.58	1.2784329	1.3002840	1.3004136
Dec. 1	248 17 20.7	43.34	1.7	0 4 16.0	0.58	1.2784665	1.3004452	1.3003779
9	248 23 7.4	43.33	1.7	0 4 11.4	0.58	1.2785000	1.3002123	1.2999491
17	248 28 54.0	43.32	1.7	0 4 6.7	0.58	1.2785335	1.2995894	1.2991347
25	248 34 40.5	43.32	1.6	0 4 2.1	0.58	1.2785671	1.2985863	1.2979458
33	248 40 27.0	43.31	-1.6	+0 3 57.4	-0.58	1.2786006	1.2972150	

NEPTUNE.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox, of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth.	
							At Date.	At Intermediate Date.
Jan. 7	83 30 43.9	21.92	-49.6	-1 18 17.7	+0.46	1.4751873	1.4619167	1.4623782
15	83 33 39.3	21.92	49.6	1 18 14.0	0.46	1.4751887	1.4629050	1.4634939
23	83 36 34.6	21.92	49.6	1 18 10.4	0.46	1.4751900	1.4641408	1.4648422
31	83 39 30.0	21.92	49.6	1 18 6.7	0.46	1.4751915	1.4655939	1.4663923
Feb. 8	83 42 25.4	21.92	49.6	1 18 3.0	0.46	1.4751929	1.4672326	1.4681107
16	83 45 20.7	21.92	-49.6	-1 17 59.3	+0.46	1.4751943	1.4690213	1.4699592
24	83 48 16.1	21.92	49.6	1 17 55.6	0.46	1.4751957	1.4709195	1.4718973
Mar. 4	83 51 11.4	21.92	49.6	1 17 51.9	0.46	1.4751971	1.4728879	1.4738866
12	83 54 6.8	21.92	49.6	1 17 48.2	0.46	1.4751985	1.4748884	1.4758881
20	83 57 2.1	21.92	49.6	1 17 44.4	0.46	1.4752000	1.4768810	1.4778622
28	83 59 57.4	21.92	-49.6	-1 17 40.7	+0.46	1.4752014	1.4788278	1.4797735
Apr. 5	84 2 52.8	21.92	49.6	1 17 37.0	0.47	1.4752028	1.4806954	1.4815894
13	84 5 48.1	21.92	49.6	1 17 33.3	0.47	1.4752043	1.4824518	1.4832786
21	84 8 43.4	21.91	49.6	1 17 29.6	0.47	1.4752057	1.4840669	1.4848133
29	84 11 38.7	21.91	49.6	1 17 25.8	0.47	1.4752072	1.4855156	1.4861711
May 7	84 14 34.0	21.91	-49.6	-1 17 22.1	+0.47	1.4752087	1.4867774	1.4873316
15	84 17 29.4	21.91	49.7	1 17 18.4	0.47	1.4752101	1.4878322	1.4882769
23	84 20 24.7	21.91	49.7	1 17 14.6	0.47	1.4752116	1.4886649	1.4889947
31	84 23 19.9	21.91	49.7	1 17 10.9	0.47	1.4752131	1.4892654	1.4894760
June 8	84 26 15.2	21.91	49.7	1 17 7.2	0.47	1.4752146	1.4896259	1.4897139
16	84 29 10.5	21.91	-49.7	-1 17 3.4	+0.47	1.4752161	1.4897403	1.4897050
24	84 32 5.8	21.91	49.7	1 16 59.7	0.47	1.4752177	1.4896085	1.4894512
July 2	84 35 1.1	21.91	49.7	1 16 55.9	0.47	1.4752192	1.4892337	1.4889563
10	84 37 56.4	21.91	49.7	1 16 52.1	0.47	1.4752207	1.4886203	1.4882264
18	84 40 51.6	21.91	49.7	1 16 48.4	0.47	1.4752223	1.4877766	1.4872728
26	84 43 46.9	21.91	-49.7	-1 16 44.6	+0.47	1.4752238	1.4867168	1.4861102
Aug. 3	84 46 42.2	21.91	49.7	1 16 40.8	0.47	1.4752254	1.4854554	1.4847541
11	84 49 37.4	21.91	49.7	1 16 37.1	0.47	1.4752270	1.4840097	1.4832251
19	84 52 32.7	21.91	49.7	1 16 33.3	0.47	1.4752286	1.4824035	1.4815479
27	84 55 27.9	21.91	49.7	1 16 29.5	0.47	1.4752302	1.4806619	1.4797485
Sept. 4	84 58 23.2	21.91	-49.7	-1 16 25.7	+0.47	1.4752318	1.4788119	1.4778556
12	85 1 18.4	21.90	49.7	1 16 22.0	0.47	1.4752334	1.4768844	1.4759028
20	85 4 13.6	21.90	49.7	1 16 18.2	0.47	1.4752350	1.4749149	1.4739250
28	85 7 8.9	21.90	49.7	1 16 14.4	0.47	1.4752366	1.4729378	1.4719574
Oct. 6	85 10 4.1	21.90	49.7	1 16 10.6	0.47	1.4752383	1.4709893	1.4700387
14	85 12 59.3	21.90	-49.7	-1 16 6.8	+0.48	1.4752399	1.4691101	1.4682080
22	85 15 54.5	21.90	49.7	1 16 3.0	0.48	1.4752416	1.4673372	1.4665023
30	85 18 49.8	21.90	49.7	1 15 59.2	0.48	1.4752432	1.4657079	1.4649586
Nov. 7	85 21 45.0	21.90	49.7	1 15 55.4	0.48	1.4752449	1.4642585	1.4636124
15	85 24 40.2	21.90	49.7	1 15 51.6	0.48	1.4752466	1.4630234	1.4624951
23	85 27 35.4	21.90	-49.7	-1 15 47.7	+0.48	1.4752483	1.4620301	1.4616317
Dec. 1	85 30 30.6	21.90	49.7	1 15 43.9	0.48	1.4752500	1.4613022	1.4610445
9	85 33 25.8	21.90	49.7	1 15 40.1	0.48	1.4752517	1.4608595	1.4607491
17	85 36 21.0	21.90	49.7	1 15 36.3	0.48	1.4752534	1.4607130	1.4607518
25	85 39 16.2	21.90	49.7	1 15 32.5	0.48	1.4752552	1.4608651	1.4610530
33	85 42 11.4	21.90	-49.7	-1 15 28.6	+0.48	1.4752569	1.4613143	

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Jan. 1	+0.1862058	+0.1947851	-827	-0.8856912	-0.8841393	-164	-0.3842407	-0.3835676	-22
2	0.2033496	0.2118987	832	0.8825187	0.8808295	179	0.3828647	0.3821319	29
3	0.2204319	0.2289487	837	0.8790717	0.8772456	195	0.3813694	0.3805771	36
4	0.2374481	0.2459288	842	0.8753511	0.8733884	211	0.3797552	0.3789037	43
5	0.2543906	0.2628334	846	0.8713577	0.8692593	227	0.3780226	0.3771122	50
6	+0.2712562	+0.2796581	-850	-0.8670930	-0.8648588	-243	-0.3761723	-0.3752028	-57
7	0.2880385	0.2963968	854	0.8625570	0.8601880	259	0.3742039	0.3731759	64
8	0.3047321	0.3130440	857	0.8577519	0.8552482	275	0.3721187	0.3710323	72
9	0.3213313	0.3295939	860	0.8526776	0.8500406	291	0.3699169	0.3687726	79
10	0.3378309	0.3460418	863	0.8473373	0.8445675	307	0.3675994	0.3663974	86
11	+0.3542257	+0.3623819	-864	-0.8417317	-0.8388301	-324	-0.3651668	-0.3639076	-93
12	0.3705097	0.3786084	865	0.8358628	0.8328301	341	0.3626200	0.3613041	100
13	0.3866772	0.3947160	866	0.8297324	0.8265699	358	0.3599600	0.3585878	107
14	0.4027239	0.4106999	867	0.8233430	0.8200519	375	0.3571876	0.3557596	115
15	0.4186437	0.4265547	868	0.8166970	0.8132782	392	0.3543040	0.3528207	122
16	+0.4344321	+0.4422753	-867	-0.8097960	-0.8062510	-409	-0.3513099	-0.3497719	-130
17	0.4500839	0.4578572	866	0.8026434	0.7989733	426	0.3482069	0.3466147	137
18	0.4655945	0.4732948	865	0.7952414	0.7914478	444	0.3449957	0.3433500	145
19	0.4809580	0.4885840	864	0.7875928	0.7836769	461	0.3416777	0.3399790	152
20	0.4961717	0.5037204	863	0.7797003	0.7756635	479	0.3382541	0.3365031	160
21	+0.5112296	+0.5186989	-861	-0.7715667	-0.7674104	-496	-0.3347261	-0.3329233	-167
22	0.5261278	0.5335160	858	0.7631951	0.7589209	514	0.3310948	0.3292408	175
23	0.5408629	0.5481673	854	0.7545882	0.7501971	531	0.3273615	0.3254569	183
24	0.5554292	0.5626486	850	0.7457482	0.7412419	549	0.3235272	0.3215726	191
25	0.5698246	0.5769560	845	0.7366787	0.7320586	566	0.3195933	0.3175893	199
26	+0.5840428	+0.5910848	-840	-0.7273822	-0.7226497	-584	-0.3155608	-0.3135080	-207
27	0.5980813	0.6050318	835	0.7178616	0.7130182	602	0.3114313	0.3093303	215
28	0.6119356	0.6187926	830	0.7081200	0.7031669	620	0.3072056	0.3050570	223
29	0.6256021	0.6323635	824	0.6981596	0.6930984	638	0.3028848	0.3006891	231
30	0.6390765	0.6457403	818	0.6879836	0.6828158	656	0.2984702	0.2962282	239
31	+0.6523547	+0.6589192	-811	-0.6775948	-0.6723218	-674	-0.2939634	-0.2916758	-247
Feb. 1	0.6654331	0.6718959	803	0.6669966	0.6616196	691	0.2893657	0.2870328	255
2	0.6783070	0.6846662	795	0.6561913	0.6507122	709	0.2846775	0.2823004	263
3	0.6909727	0.6972264	786	0.6451827	0.6396033	726	0.2799015	0.2774807	271
4	0.7034265	0.7095725	777	0.6339739	0.6282952	743	0.2750383	0.2725744	279
5	+0.7156638	+0.7216999	-767	-0.6225677	-0.6167920	-760	-0.2700895	-0.2675835	-286
6	0.7276803	0.7336049	757	0.6109684	0.6050972	777	0.2650567	0.2625092	294
7	0.7394729	0.7452838	747	0.5991790	0.5932143	794	0.2599414	0.2573535	302
8	0.7510371	0.7567323	737	0.5872037	0.5811476	810	0.2547456	0.2521180	310
9	0.7623693	0.7679475	726	0.5750464	0.5689007	826	0.2494707	0.2468041	317
10	+0.7734663	+0.7789248	-714	-0.5627109	-0.5564774	-842	-0.2441185	-0.2414139	-325
11	0.7843229	0.7896608	702	0.5502009	0.5438819	858	0.2386907	0.2359493	332
12	0.7949378	0.8001533	690	0.5375212	0.5311191	873	0.2331899	0.2304124	340
13	0.8053070	0.8103082	676	0.5246762	0.5181029	888	0.2276171	0.2248045	347
14	0.8154268	0.8203026	662	0.5116668	0.5051077	903	0.2219747	0.2191279	355
15	+0.8252950	+0.8301336	-648	-0.4985008	-0.4918679	-918	-0.2162643	-0.2133543	-362
16	+0.8340001	+0.8396184	-634	-0.4851915	-0.4784784	-933	-0.2104501	-0.2075759	-369

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Feb. 16	+0.8349081	+0.8396184	-634	-0.4851915	-0.4784784	-933	-0.2104881	-0.2075759	-369
17	0.8442642	0.8488451	619	0.4717288	0.4649431	947	0.2046480	0.2017045	376
18	0.8533608	0.8578111	604	0.4581221	0.4512665	961	0.1987459	0.1957720	383
19	0.8621956	0.8665142	589	0.4443768	0.4374536	975	0.1927832	0.1897801	390
20	0.8707664	0.8749521	573	0.4304973	0.4235082	989	0.1867625	0.1837308	397
21	+0.8790710	+0.8831227	-557	-0.4164871	-0.4094346	-1002	-0.1806851	-0.1776258	-403
22	0.8871071	0.8910240	541	0.4023512	0.3952374	1015	0.1745532	0.1714674	410
23	0.8948733	0.8986548	524	0.3880937	0.3809210	1028	0.1683686	0.1652571	417
24	0.9023681	0.9060126	507	0.3737195	0.3664895	1041	0.1621330	0.1589966	423
25	0.9095883	0.9130953	489	0.3592316	0.3519466	1054	0.1558482	0.1526879	429
26	+0.9165332	+0.9199018	-471	-0.3446349	-0.3372972	-1066	-0.1495159	-0.1463326	-436
27	0.9232009	0.9264301	453	0.3299338	0.3225454	1078	0.1431382	0.1399329	442
28	0.9295893	0.9326781	435	0.3151323	0.3076950	1089	0.1367168	0.1334902	448
Mar. 1	0.9356963	0.9386439	416	0.3002342	0.2927505	1100	0.1302533	0.1270065	454
2	0.9415206	0.9443261	397	0.2852444	0.2777164	1111	0.1237499	0.1204839	460
3	+0.9470602	+0.9497227	-377	-0.2701671	-0.2625969	-1121	-0.1172086	-0.1139241	-465
4	0.9523137	0.9548325	357	0.2550064	0.2473962	1131	0.1106307	0.1073288	471
5	0.9572789	0.9596529	337	0.2397669	0.2321191	1141	0.1040186	0.1007004	476
6	0.9619542	0.9641828	317	0.2244534	0.2167704	1150	0.0973745	0.0940410	482
7	0.9663384	0.9684207	296	0.2090705	0.2013547	1159	0.0907002	0.0873525	487
8	+0.9704296	+0.9723650	-275	-0.1936230	-0.1858767	-1168	-0.0839979	-0.0806369	-492
9	0.9742267	0.9760146	254	0.1781155	0.1703409	1176	0.0772697	0.0738966	497
10	0.9777286	0.9793684	233	0.1625534	0.1547533	1184	0.0705180	0.0671338	502
11	0.9809341	0.9824255	211	0.1469414	0.1391183	1193	0.0637446	0.0603506	507
12	0.9838425	0.9851851	189	0.1312846	0.1234410	1200	0.0569521	0.0535493	511
13	+0.9864530	+0.9876461	-167	-0.1155884	-0.1077271	-1207	-0.0501426	-0.0467322	-515
14	0.9887645	0.9898083	145	0.0998578	0.0919808	1214	0.0433182	0.0399011	519
15	0.9907775	0.9916719	123	0.0840972	0.0762077	1220	0.0364811	0.0330586	523
16	0.9924916	0.9932365	100	0.0683126	0.0604126	1226	0.0296336	0.0262066	527
17	0.9939068	0.9945025	77	0.0525082	0.0446005	1232	0.0227778	0.0193475	531
18	+0.9950234	+0.9954694	-54	-0.0366898	-0.0287766	-1237	-0.0159159	-0.0124832	-535
19	0.9958409	0.9961380	31	0.0208616	0.0129453	1242	0.0090498	0.0056159	539
20	0.9963607	0.9965089	-8	-0.0050285	+0.0028878	1247	-0.0021817	+0.0012524	542
21	0.9965828	0.9965822	+16	+0.0108035	0.0187187	1251	+0.0046863	0.0081198	545
22	0.9965075	0.9963586	40	0.0266324	0.0345436	1254	0.0115525	0.0149843	548
23	+0.9961357	+0.9958388	+64	+0.0424518	+0.0503565	-1257	+0.0184149	+0.0218439	-551
24	0.9954680	0.9950233	88	0.0582573	0.0661537	1260	0.0252713	0.0286969	553
25	0.9945048	0.9939126	112	0.0740451	0.0819306	1262	0.0321203	0.0355412	555
26	0.9932468	0.9925079	136	0.0898100	0.0976829	1264	0.0389595	0.0423750	557
27	0.9916955	0.9908094	161	0.1055485	0.1134061	1266	0.0457873	0.0491963	559
28	+0.9898500	+0.9888175	+185	+0.1212555	+0.1290963	-1267	+0.0526017	+0.0560034	-560
29	0.9877121	0.9865340	210	0.1369278	0.1447492	1268	0.0594011	0.0627945	561
30	0.9852830	0.9839588	234	0.1525603	0.1603603	1269	0.0661834	0.0695676	562
31	0.9825618	0.9810922	259	0.1681487	0.1759249	1270	0.0729467	0.0763205	563
32	0.9795502	0.9779358	284	0.1836884	0.1914389	1270	0.0796888	0.0830515	564
33	+0.9762491	+0.9744898	+309	+0.1991756	+0.2068978	-1269	+0.0864083	+0.0897587	-565
34	+0.9726584	+0.9707555	+334	+0.2146048	+0.2222968	-1268	+0.0931027	+0.0964400	-566

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Apr. 1	+0.9795502	+0.9779358	+ 284	+0.1836884	+0.1914389	-1270	+0.0796888	+0.0830515	-564
2	0.9762491	0.9744898	309	0.1991756	0.2068978	1269	0.0864083	0.0897587	565
3	0.9726584	0.9707555	334	0.2146048	0.2222968	1268	0.0931027	0.0964400	566
4	0.9687807	0.9667337	359	0.2299727	0.2376316	1267	0.0997704	0.1030934	566
5	0.9646151	0.9624256	384	0.2452733	0.2528975	1266	0.1064088	0.1097166	566
6	+0.9601649	+0.9578327	+ 410	+0.2605033	+0.2680897	-1265	+0.1130163	+0.1163079	-566
7	0.9554296	0.9529558	435	0.2756569	0.2832037	1263	0.1195909	0.1228650	566
8	0.9504115	0.9477966	461	0.2907299	0.2982347	1261	0.1261301	0.1293859	566
9	0.9451115	0.9423567	486	0.3057176	0.3131781	1258	0.1326322	0.1358687	565
10	0.9395324	0.9366388	512	0.3206153	0.3280289	1255	0.1390951	0.1423112	564
11	+0.9336760	+0.9306443	+ 537	+0.3354185	+0.3427833	-1251	+0.1455169	+0.1487118	-563
12	0.9275440	0.9243753	563	0.3501227	0.3574360	1247	0.1518956	0.1550681	562
13	0.9211387	0.9178343	588	0.3647228	0.3719827	1243	0.1582289	0.1613780	560
14	0.9144625	0.9110239	614	0.3792151	0.3864191	1238	0.1645153	0.1676403	558
15	0.9075183	0.9039462	639	0.3935945	0.4007408	1233	0.1707529	0.1738527	556
16	+0.9003081	+0.8966042	+ 665	+0.4078575	+0.4149441	-1227	+0.1769398	+0.1800138	-554
17	0.8928350	0.8890009	691	0.4220001	0.4290246	1221	0.1830745	0.1861215	551
18	0.8851022	0.8811391	717	0.4360174	0.4429784	1215	0.1891548	0.1921744	548
19	0.8771120	0.8730211	743	0.4499068	0.4568020	1208	0.1951798	0.1981709	545
20	0.8688668	0.8646497	768	0.4636637	0.4704912	1201	0.2011474	0.2041092	542
21	+0.8603700	+0.8560282	+ 794	+0.4772844	+0.4840432	-1194	+0.2070561	+0.2099880	-539
22	0.8516245	0.8471590	819	0.4907667	0.4974541	1187	0.2129047	0.2158058	536
23	0.8426323	0.8380449	845	0.5041052	0.5107198	1179	0.2186913	0.2215610	532
24	0.8333971	0.8286892	870	0.5172975	0.5238379	1171	0.2244146	0.2272521	528
25	0.8239215	0.8190944	895	0.5303406	0.5368050	1162	0.2300732	0.2328778	524
26	+0.8142081	+0.8092530	+ 920	+0.5432306	+0.5496171	-1153	+0.2356656	+0.2384364	-520
27	0.8042594	0.7991978	946	0.5559640	0.5622709	1144	0.2411901	0.2439265	516
28	0.7940785	0.7889018	971	0.5685375	0.5747634	1134	0.2466454	0.2493467	511
29	0.7836680	0.7783774	996	0.5809482	0.5870913	1124	0.2520301	0.2546954	506
30	0.7730307	0.7676279	1021	0.5931922	0.5992508	1114	0.2573424	0.2599711	501
May 1	+0.7621696	+0.7566563	+1046	+0.6052665	+0.6112384	-1103	+0.2625812	+0.2651722	-496
2	0.7510881	0.7454651	1071	0.6171665	0.6230509	1091	0.2677443	0.2702973	490
3	0.7397881	0.7340577	1096	0.6288906	0.6346848	1079	0.2728308	0.2753446	484
4	0.7282740	0.7224372	1121	0.6404334	0.6461361	1066	0.2778386	0.2803127	478
5	0.7165480	0.7106069	1146	0.6517925	0.6574021	1053	0.2827666	0.2852002	472
6	+0.7046144	+0.6985707	+1170	+0.6629645	+0.6684787	-1040	+0.2876134	+0.2900055	-466
7	0.6924763	0.6863318	1195	0.6739449	0.6793631	1027	0.2923767	0.2947271	459
8	0.6801377	0.6738941	1219	0.6847324	0.6900519	1013	0.2970562	0.2993636	452
9	0.6676017	0.6612612	1243	0.6953214	0.7005408	999	0.3016493	0.3039134	445
10	0.6548729	0.6484373	1267	0.7057098	0.7108278	985	0.3061557	0.3083757	438
11	+0.6419549	+0.6354264	+1291	+0.7158946	+0.7209099	- 970	+0.3105734	+0.3127487	-431
12	0.6288526	0.6222336	1315	0.7258731	0.7307838	954	0.3149013	0.3170313	423
13	0.6155701	0.6088623	1338	0.7356417	0.7404404	938	0.3191385	0.3212224	415
14	0.6021108	0.5953163	1361	0.7451977	0.7498954	922	0.3232832	0.3253209	407
15	0.5884795	0.5816010	1384	0.7545391	0.7591285	906	0.3273351	0.3293258	399
16	+0.5746811	+0.5677202	+1407	+0.7636632	+0.7681436	- 889	+0.3312928	+0.3332360	- 390
17	+0.5607191	+0.5536785	+1430	+0.7725688	+0.7769382	- 871	+0.3351554	+0.3370507	- 381

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
May 17	+0.5607191	+0.5536785	+1430	+0.7725688	+0.7769382	-871	+0.3351554	+0.3370507	-381
18	0.5465987	0.5394802	1452	0.7812519	0.7855099	853	0.3389219	0.3407688	372
19	0.5323235	0.5251292	1474	0.7897117	0.7938571	835	0.3425915	0.3443899	363
20	0.5178979	0.5106299	1496	0.7979458	0.8019777	817	0.3461636	0.3479127	354
21	0.5033259	0.4959864	1518	0.8059524	0.8098697	798	0.3496370	0.3513365	345
22	+0.4886120	+0.4812033	+1539	+0.8137295	+0.8175315	-778	+0.3530111	+0.3546607	-336
23	0.4737607	0.4662843	1560	0.8212756	0.8249614	758	0.3562851	0.3578843	326
24	0.4587749	0.4512334	1581	0.8285889	0.8321578	738	0.3594582	0.3610067	316
25	0.4436600	0.4360550	1602	0.8356679	0.8391187	718	0.3625297	0.3640270	306
26	0.4284190	0.4207528	1622	0.8425101	0.8458421	697	0.3654986	0.3669444	296
27	+0.4130567	+0.4053310	+1642	+0.8491144	+0.8523269	-675	+0.3683643	+0.3697580	-285
28	0.3975762	0.3897933	1661	0.8554792	0.8585709	653	0.3711256	0.3724673	274
29	0.3819825	0.3741444	1680	0.8616018	0.8645722	631	0.3737826	0.3750716	263
30	0.3662796	0.3583883	1699	0.8674818	0.8703297	608	0.3763341	0.3775698	252
31	0.3504713	0.3425290	1718	0.8731162	0.8758409	585	0.3787787	0.3799608	241
June 1	+0.3345621	+0.3265712	+1737	+0.8785035	+0.8811041	-561	+0.3811159	+0.3822441	-230
2	0.3185568	0.3105192	1755	0.8836424	0.8861184	537	0.3833452	0.3844193	219
3	0.3024592	0.2943773	1773	0.8885316	0.8908813	513	0.3854661	0.3864854	208
4	0.2862742	0.2781507	1791	0.8931679	0.8953914	489	0.3874772	0.3884416	196
5	0.2700072	0.2618443	1808	0.8975515	0.8996474	464	0.3893783	0.3902873	184
6	+0.2536625	+0.2454621	+1825	+0.9016795	+0.9036478	-439	+0.3911686	+0.3920220	-172
7	0.2372448	0.2290102	1841	0.9055519	0.9073912	413	0.3928476	0.3936453	160
8	0.2207592	0.2124923	1857	0.9091660	0.9108764	387	0.3944149	0.3951565	148
9	0.2042104	0.1959144	1873	0.9125222	0.9141030	361	0.3958700	0.3965554	136
10	0.1876046	0.1792815	1888	0.9156188	0.9170694	334	0.3972126	0.3978415	124
11	+0.1709457	+0.1625983	+1902	+0.9184548	+0.9197751	-307	+0.3984421	+0.3990145	-112
12	0.1542397	0.1458704	1916	0.9210301	0.9222200	279	0.3995587	0.4000747	100
13	0.1374909	0.1291021	1929	0.9233446	0.9244037	251	0.4005623	0.4010214	87
14	0.1207046	0.1122990	1942	0.9253973	0.9263253	223	0.4014522	0.4018546	74
15	0.1038858	0.0954652	1954	0.9271879	0.9279850	194	0.4022286	0.4025744	60
16	+0.0870384	+0.0786063	+1966	+0.9287166	+0.9293827	-165	+0.4028918	+0.4031807	-46
17	0.0701691	0.0617272	1977	0.9299833	0.9305183	136	0.4034413	0.4036736	32
18	0.0532813	0.0448318	1988	0.9309878	0.9313919	106	0.4038775	0.4040529	19
19	0.0363795	0.0279253	1998	0.9317306	0.9320038	76	0.4041999	0.4043187	-5
20	0.0194694	+0.0110119	2008	0.9322117	0.9323542	46	0.4044092	0.4044713	+9
21	+0.0025538	-0.0059041	+2017	+0.9324313	+0.9324430	-15	+0.4045050	+0.4045104	+23
22	-0.0143614	0.0228179	2026	0.9323894	0.9322705	+16	0.4044875	0.4044362	36
23	0.0312724	0.0397247	2034	0.9320861	0.9318366	47	0.4043565	0.4042486	50
24	0.0481743	0.0566209	2042	0.9315217	0.9311417	78	0.4041124	0.4039479	64
25	0.0650636	0.0735018	2049	0.9306967	0.9301863	110	0.4037551	0.4035340	78
26	-0.0819351	-0.0903630	+2055	+0.9296108	+0.9289700	+142	+0.4032846	+0.4030069	+92
27	0.0987849	0.1072001	2061	0.9282641	0.9274932	174	0.4027008	0.4023665	106
28	0.1156080	0.1240082	2067	0.9266571	0.9257557	206	0.4020039	0.4016130	120
29	0.1324002	0.1407831	2072	0.9247894	0.9237580	239	0.4011938	0.4007464	135
30	0.1491564	0.1575197	2076	0.9226615	0.9215003	272	0.4002708	0.3997670	149
31	-0.1658723	-0.1742136	+2079	+0.9202744	+0.9189831	+305	+0.3992349	+0.3986746	+164
32	-0.1825429	-0.1908599	+2081	+0.9176268	+0.9162063	+338	+0.3980860	+0.3974695	+178

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
July 1	-0.1658723	-0.1742136	+2079	+0.9202744	+0.9189831	+ 305	+0.3992349	+0.3986746	+164
2	0.1825429	0.1908599	2081	0.9176268	0.9162062	338	0.3980860	0.3974695	178
3	0.1991640	0.2074543	2082	0.9147209	0.9131710	371	0.3968249	0.3961521	193
4	0.2157300	0.2239905	2083	0.9115567	0.9098777	404	0.3954514	0.3947227	207
5	0.2322354	0.2404644	2084	0.9081342	0.9063264	437	0.3939660	0.3931814	222
6	-0.2486766	-0.2568712	+2083	+0.9044543	+0.9025183	+ 471	+0.3923689	+0.3915286	+236
7	0.2650478	0.2732055	2082	0.9005185	0.8984550	505	0.3906608	0.3897652	250
8	0.2813439	0.2894624	2081	0.8963279	0.8941370	539	0.3888420	0.3878913	265
9	0.2975604	0.3056373	2080	0.8918828	0.8895658	573	0.3869131	0.3859077	279
10	0.3136925	0.3217252	2078	0.8871859	0.8847435	607	0.3848750	0.3838151	293
11	-0.3297349	-0.3377208	+2075	+0.8822385	+0.8796704	+ 641	+0.3827282	+0.3816140	+308
12	0.3456825	0.3536196	2071	0.8770403	0.8743487	675	0.3804730	0.3793053	322
13	0.3615312	0.3694173	2066	0.8715955	0.8687813	709	0.3781109	0.3768900	337
14	0.3772771	0.3851096	2060	0.8659058	0.8629683	743	0.3756427	0.3743685	351
15	0.3929145	0.4006916	2053	0.8599702	0.8569123	778	0.3730680	0.3717416	366
16	-0.4084400	-0.4161593	+2045	+0.8553794	+0.8506160	+ 812	+0.3703891	+0.3690106	+380
17	0.4238491	0.4315087	2037	0.8473780	0.8440806	847	0.3676062	0.3661760	395
18	0.4391376	0.4467352	2028	0.8407339	0.8373084	882	0.3647202	0.3632388	410
19	0.4543011	0.4618352	2019	0.8338343	0.8303015	916	0.3617319	0.3601997	425
20	0.4693366	0.4768047	2008	0.8267105	0.8230620	950	0.3586423	0.3570599	440
21	-0.4842392	-0.4916399	+1997	+0.8193558	+0.8155919	+ 984	+0.3554523	+0.3538199	+454
22	0.4990061	0.5063369	1985	0.8117709	0.8078930	1018	0.3521627	0.3504807	468
23	0.5136323	0.5208918	1973	0.8039585	0.7999674	1052	0.3487740	0.3470428	482
24	0.5281149	0.5353009	1960	0.7959200	0.7918168	1086	0.3452873	0.3435074	496
25	0.5424494	0.5495600	1946	0.7876580	0.7834437	1120	0.3417034	0.3398753	510
26	-0.5566322	-0.5636656	+1931	+0.7791743	+0.7748498	+1153	+0.3380231	+0.3361472	+524
27	0.5706596	0.5776134	1915	0.7704706	0.7660358	1186	0.3342475	0.3323240	537
28	0.5845268	0.5913994	1899	0.7615489	0.7570071	1219	0.3303769	0.3284064	551
29	0.5982304	0.6050194	1882	0.7524117	0.7477629	1252	0.3264127	0.3243959	565
30	0.6117661	0.6184699	1864	0.7430612	0.7383058	1284	0.3223561	0.3202932	579
31	-0.6251303	-0.6317464	+1846	+0.7335000	+0.7286407	+1316	+0.3182074	+0.3160990	+592
Aug. 1	0.6383178	0.6448445	1827	0.7237293	0.7187665	1348	0.3139680	0.3118147	606
2	0.6513258	0.6577608	1807	0.7137523	0.7086872	1380	0.3096392	0.3074416	619
3	0.6641492	0.6704907	1787	0.7035717	0.6984061	1412	0.3052220	0.3029808	632
4	0.6767845	0.6830301	1766	0.6931906	0.6879255	1444	0.3007179	0.2984335	645
5	-0.6892271	-0.6953751	+1744	+0.6826113	+0.6772483	+1475	+0.2961278	+0.2938009	+658
6	0.7014735	0.7075220	1722	0.6718369	0.6663777	1506	0.2914530	0.2890845	671
7	0.7135200	0.7194669	1699	0.6608709	0.6553168	1537	0.2866954	0.2842858	684
8	0.7253622	0.7312057	1676	0.6497160	0.6440691	1568	0.2818560	0.2794061	696
9	0.7369971	0.7427356	1652	0.6383765	0.6326382	1598	0.2769365	0.2744472	709
10	-0.7484209	-0.7540525	+1627	+0.6268549	+0.6210270	+1627	+0.2719382	+0.2694101	+721
11	0.7596298	0.7651528	1601	0.6151549	0.6092395	1656	0.2668628	0.2642968	733
12	0.7706211	0.7760344	1573	0.6032810	0.5972794	1685	0.2617121	0.2591088	745
13	0.7813921	0.7866939	1545	0.5912355	0.5851499	1713	0.2564870	0.2538473	757
14	0.7919395	0.7971284	1517	0.5790229	0.5728551	1741	0.2511896	0.2485142	769
15	-0.8022602	-0.8073346	+1488	+0.5666167	+0.5603980	+1769	+0.2458212	+0.2431108	+780
16	-0.8123513	-0.8173103	+1458	+0.5541096	+0.5477823	+1796	+0.2403831	+0.2376385	+791

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Aug. 16	-0.8123513	-0.8173103	+1458	+0.5541096	+0.5477823	+1796	+0.2403831	+0.2376385	+ 791
17	0.8222110	0.8270532	1428	0.5414162	0.5350123	1823	0.2348772	0.2320993	802
18	0.8318363	0.8365601	1398	0.5285704	0.5220907	1849	0.2293050	0.2264944	813
19	0.8412244	0.8458287	1367	0.5155742	0.5090214	1875	0.2236677	0.2208253	824
20	0.8503729	0.8548567	1335	0.5024325	0.4958079	1900	0.2179671	0.2150934	834
21	-0.8592798	-0.8636417	+1303	+0.4891482	+0.4824537	+1925	+0.2122044	+0.2093003	+ 844
22	0.8679422	0.8721807	1270	0.4757247	0.4689619	1949	0.2063812	0.2034474	854
23	0.8763571	0.8804715	1237	0.4621656	0.4553363	1973	0.2004991	0.1975363	864
24	0.8845233	0.8885119	1203	0.4484742	0.4415801	1996	0.1945594	0.1915685	874
25	0.8924371	0.8962988	1169	0.4346542	0.4276968	2019	0.1885637	0.1855453	884
26	-0.9000965	-0.9038300	+1134	+0.4207086	+0.4136902	+2041	+0.1825135	+0.1794686	+ 893
27	0.9074990	0.9111028	1099	0.4066420	0.3995642	2063	0.1764106	0.1733398	902
28	0.9146413	0.9181146	1063	0.3924574	0.3853220	2084	0.1702563	0.1671605	911
29	0.9215221	0.9248632	1026	0.3781584	0.3709674	2104	0.1640525	0.1609325	919
30	0.9281379	0.9313458	989	0.3637493	0.3565046	2123	0.1578008	0.1546575	927
31	-0.9344866	-0.9375600	+ 951	+0.3492338	+0.3419377	+2142	+0.1515030	+0.1483375	+ 935
Sept. 1	0.9405657	0.9435034	913	0.3346167	0.3272709	2160	0.1451611	0.1419740	943
2	0.9463728	0.9491740	874	0.3199012	0.3125083	2177	0.1387766	0.1355692	950
3	0.9519065	0.9545698	835	0.3050928	0.2976548	2194	0.1323520	0.1291250	957
4	0.9571637	0.9596881	796	0.2901952	0.2827142	2210	0.1258887	0.1226433	964
5	-0.9621429	-0.9645278	+ 756	+0.2752127	+0.2676913	+2226	+0.1193889	+0.1161259	+ 971
6	0.9668427	0.9690871	716	0.2601505	0.2525909	2241	0.1128546	0.1095751	978
7	0.9712609	0.9733640	676	0.2450130	0.2374172	2256	0.1062879	0.1029929	984
8	0.9753962	0.9773574	635	0.2298045	0.2221755	2270	0.0996904	0.0963809	990
9	0.9792476	0.9810665	594	0.2145305	0.2068700	2284	0.0930646	0.0897416	996
10	-0.9828139	-0.9844897	+ 553	+0.1991948	+0.1915054	+2297	+0.0864122	+0.0830767	+1001
11	0.9860936	0.9876259	512	0.1838025	0.1760866	2309	0.0797354	0.0763884	1006
12	0.9890864	0.9904748	470	0.1683583	0.1606181	2321	0.0730362	0.0695787	1011
13	0.9917911	0.9930356	427	0.1528666	0.1451043	2332	0.0663162	0.0629491	1016
14	0.9942079	0.9953077	384	0.1373318	0.1295497	2342	0.0595776	0.0562019	1020
15	-0.9963352	-0.9972905	+ 341	+0.1217585	+0.1139588	+2352	+0.0528222	+0.0494388	+1024
16	0.9981734	0.9989837	298	0.1061513	0.0983363	2361	0.0460519	0.0426618	1028
17	0.9997214	1.0003864	255	0.0905142	0.0826858	2370	0.0392686	0.0358727	1032
18	1.0009789	1.0014989	211	0.0748515	0.0670120	2377	0.0324742	0.0290733	1035
19	1.0019460	1.0023200	167	0.0591678	0.0513192	2383	0.0256703	0.0222654	1038
20	-1.0026212	-1.0028496	+ 123	+0.0434668	+0.0356114	+2388	+0.0188588	+0.0154508	+1040
21	1.0030051	1.0030874	78	0.0277534	0.0198931	2393	0.0120417	0.0086316	1042
22	1.0030965	1.0030326	+ 34	+0.0120312	+0.0041683	2397	+0.0052208	+0.0018095	1044
23	1.0028954	1.0026847	- 11	-0.0036951	-0.0115588	2400	-0.0016022	-0.0050140	1045
24	1.0024007	1.0020438	56	0.0194218	0.0272834	2403	0.0084254	0.0118362	1046
25	-1.0016136	-1.0011097	- 101	-0.0351434	-0.0430013	+2406	-0.0152462	-0.0186555	+1046
26	1.0005323	0.9998813	146	0.0508564	0.0587082	2408	0.0220636	0.0254702	1047
27	0.9991567	0.9983586	191	0.0665561	0.0743994	2409	0.0288751	0.0322780	1047
28	0.9974870	0.9965418	236	0.0822374	0.0900697	2409	0.0356786	0.0390768	1046
29	0.9955230	0.9944304	282	0.0978958	0.1057153	2408	0.0424722	0.0458646	1045
30	-0.9932643	-0.9920247	- 327	-0.1135273	-0.1213309	+2407	-0.0492537	-0.0526393	+1044
31	-0.9907116	-0.9893250	- 373	0.1291256	-0.1369112	+2405	-0.0560210	-0.0593986	+1043



## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Oct. 1	-0.9907116	-0.9893250	- 373	-0.1291256	-0.1369112	+2405	-0.0560210	-0.0593986	+1043
2	0.9878648	0.9863311	419	0.1446868	0.1524518	2402	0.0627718	0.0661404	1042
3	0.9847241	0.9830437	465	0.1602058	0.1679480	2399	0.0695042	0.0728629	1040
4	0.9812902	0.9794639	511	0.1756778	0.1833944	2395	0.0762163	0.0795638	1038
5	0.9775647	0.9755926	556	0.1910973	0.1987860	2391	0.0829052	0.0862404	1035
6	-0.9735478	-0.9714304	- 602	-0.2064597	-0.2141179	+2386	-0.0895692	-0.0928912	+1032
7	0.9692407	0.9669789	647	0.2217600	0.2293855	2380	0.0962061	0.0995139	1029
8	0.9646449	0.9622391	693	0.2369936	0.2445836	2373	0.1028141	0.1061064	1025
9	0.9597615	0.9571244	738	0.2521551	0.2597078	2365	0.1093907	0.1126668	1021
10	0.9545924	0.9519011	784	0.2672408	0.2747533	2357	0.1159344	0.1191931	1016
11	-0.9491391	-0.9463066	- 829	-0.2822449	-0.2897153	+2348	-0.1224428	-0.1256832	+1011
12	0.9434037	0.9404303	875	0.2971637	0.3045893	2339	0.1289141	0.1321352	1006
13	0.9373870	0.9342742	920	0.3119919	0.3193712	2329	0.1353464	0.1385475	1001
14	0.9310920	0.9278406	965	0.3267266	0.3340573	2318	0.1417381	0.1449181	995
15	0.9245202	0.9211311	1010	0.3413628	0.3486423	2306	0.1480871	0.1512450	989
16	-0.9176735	-0.9141475	-1055	-0.3558955	-0.3631223	+2293	-0.1543915	-0.1575267	+ 982
17	0.9105535	0.9068919	1100	0.3703219	0.3774938	2280	0.1606501	0.1637614	975
18	0.9031627	0.8993661	1145	0.3846375	0.3917522	2266	0.1668605	0.1699471	968
19	0.8955025	0.8915722	1189	0.3988376	0.4058934	2251	0.1730210	0.1760821	961
20	0.8875755	0.8835125	1233	0.4129189	0.4199136	2235	0.1791301	0.1821648	953
21	-0.8793833	-0.8751882	-1277	-0.4268771	-0.4338089	+2219	-0.1851859	-0.1881933	+ 945
22	0.8709274	0.8666015	1321	0.4407084	0.4475749	2203	0.1911867	0.1941657	936
23	0.8622104	0.8577548	1365	0.4544079	0.4612074	2186	0.1971304	0.2000805	927
24	0.8532345	0.8486499	1409	0.4679727	0.4747031	2168	0.2030158	0.2059358	918
25	0.8440013	0.8392892	1452	0.4813982	0.4880573	2150	0.2088405	0.2117296	909
26	-0.8345137	-0.8296746	-1495	-0.4946799	-0.5012654	+2131	-0.2146028	-0.2174599	+ 899
27	0.8247727	0.8198083	1538	0.5078133	0.5143231	2112	0.2203007	0.2231250	889
28	0.8147817	0.8096935	1581	0.5207945	0.5272271	2092	0.2259325	0.2287231	878
29	0.8045437	0.7993325	1623	0.5336201	0.5399726	2071	0.2314964	0.2342523	867
30	0.7940604	0.7887276	1665	0.5462842	0.5525547	2048	0.2369904	0.2397106	856
31	-0.7833347	-0.7778823	-1707	-0.5587835	-0.5649698	+2024	-0.2424125	-0.2450960	+ 845
Nov. 1	0.7723705	0.7667998	1748	0.5711134	0.5772135	2000	0.2477610	0.2504071	833
2	0.7611707	0.7554834	1789	0.5832698	0.5892815	1976	0.2530342	0.2556419	821
3	0.7497384	0.7439363	1830	0.5952484	0.6011699	1951	0.2582299	0.2607984	809
4	0.7380774	0.7321622	1870	0.6070454	0.6128745	1926	0.2633471	0.2658754	797
5	-0.7261912	-0.7201650	-1910	-0.6186566	-0.6243913	+1900	-0.2683832	-0.2708706	+ 784
6	0.7140839	0.7079486	1950	0.6300780	0.6357168	1873	0.2733373	0.2757831	771
7	0.7017594	0.6955166	1989	0.6413068	0.6468475	1845	0.2782077	0.2806109	758
8	0.6892210	0.6828731	2028	0.6523384	0.6577796	1817	0.2829927	0.2853526	744
9	0.6764732	0.6700219	2067	0.6631701	0.6685098	1788	0.2876909	0.2900070	730
10	-0.6635198	-0.6569675	-2105	-0.6737983	-0.6790350	+1759	-0.2923009	-0.2945725	+ 715
11	0.6503655	0.6437141	2143	0.6842196	0.6893518	1730	0.2968215	0.2990477	700
12	0.6370138	0.6302653	2180	0.6944313	0.6994576	1700	0.3012512	0.3034317	685
13	0.6234690	0.6166254	2217	0.7044302	0.7093493	1670	0.3055889	0.3077228	670
14	0.6097351	0.6027987	2253	0.7142142	0.7190242	1639	0.3098332	0.3119200	655
15	-0.5958164	-0.5887889	-2289	-0.7237790	-0.7284785	+1607	-0.3139828	-0.3160217	+ 639
16	-0.5817167	-0.5746004	-2325	-0.7331223	-0.7377104	+1575	-0.3180364	-0.3200270	+ 623

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Nov. 16	-0.5817167	-0.5746004	-2325	-0.7331223	-0.7377104	+1575	-0.3180364	-0.3200270	+623
17	0.5674404	0.5602369	2360	0.7422423	0.7467178	1542	0.3219933	0.3239351	606
18	0.5529906	0.5457021	2394	0.7511364	0.7554976	1508	0.3258522	0.3277443	589
19	0.5383720	0.5310008	2427	0.7598011	0.7640462	1472	0.3296115	0.3314534	572
20	0.5235889	0.5161367	2460	0.7682329	0.7723618	1436	0.3332700	0.3350614	555
21	-0.5086447	-0.5011136	-2493	-0.7764318	-0.7804422	+1400	-0.3368272	-0.3385673	+537
22	0.4935438	0.4859361	2525	0.7843930	0.7882836	1363	0.3402815	0.3419695	519
23	0.4782909	0.4706084	2556	0.7921138	0.7958834	1326	0.3436313	0.3452667	501
24	0.4628894	0.4551345	2587	0.7995922	0.8032401	1288	0.3468758	0.3484583	483
25	0.4473441	0.4395191	2617	0.8068263	0.8103503	1249	0.3500141	0.3515428	465
26	-0.4316598	-0.4237664	-2647	-0.8138121	-0.8172110	+1210	-0.3530445	-0.3545189	+446
27	0.4158399	0.4078813	2676	0.8205470	0.8238197	1169	0.3559659	0.3573855	427
28	0.3998908	0.3918690	2705	0.8270288	0.8301745	1128	0.3587775	0.3601418	408
29	0.3838167	0.3757342	2733	0.8332560	0.8362727	1087	0.3614782	0.3627866	389
30	0.3676225	0.3594821	2760	0.8392247	0.8421117	1046	0.3640669	0.3653190	370
Dec. 1	-0.3513136	-0.3431178	-2786	-0.8449335	-0.8476808	+1005	-0.3665428	-0.3677381	+350
2	0.3348953	0.3266468	2812	0.8503802	0.8530043	963	0.3689048	0.3700428	330
3	0.3183728	0.3100741	2836	0.8555620	0.8580535	920	0.3711521	0.3722324	310
4	0.3017514	0.2934053	2860	0.8604783	0.8628361	877	0.3732838	0.3743064	290
5	0.2850367	0.2766463	2884	0.8651267	0.8673499	833	0.3752997	0.3762638	269
6	-0.2682345	-0.2598023	-2907	-0.8695057	-0.8715940	+789	-0.3771986	-0.3781043	+248
7	0.2513502	0.2428786	2928	0.8736145	0.8755671	744	0.3789805	0.3798273	227
8	0.2343889	0.2258813	2949	0.8774516	0.8792678	698	0.3806447	0.3814325	206
9	0.2173566	0.2088152	2968	0.8810157	0.8826951	651	0.3821907	0.3829191	185
10	0.2002581	0.1916860	2987	0.8843060	0.8858484	604	0.3836178	0.3842868	163
11	-0.1830995	-0.1744991	-3005	-0.8873221	-0.8887269	+557	-0.3849262	-0.3855357	+142
12	0.1658856	0.1572955	3022	0.8900628	0.8913298	510	0.3861154	0.3866653	120
13	0.1486215	0.1399723	3038	0.8925279	0.8936568	462	0.3871852	0.3876750	98
14	0.1313126	0.1226432	3054	0.8947164	0.8957071	413	0.3881349	0.3885650	76
15	0.1139645	0.1052770	3069	0.8966286	0.8974806	364	0.3889651	0.3893350	54
16	-0.0965817	-0.0878791	-3083	-0.8982633	-0.8989765	+315	-0.3896748	-0.3899845	+32
17	0.0791697	0.0704540	3096	0.8996203	0.9001945	266	0.3902641	0.3905135	+10
18	0.0617328	0.0530068	3109	0.9006991	0.9011345	217	0.3907327	0.3909218	-12
19	0.0442765	0.0355427	3120	0.9015001	0.9017955	167	0.3910807	0.3912092	34
20	0.0268060	0.0180669	3131	0.9020212	0.9021776	116	0.3913074	0.3913753	57
21	-0.0093262	-0.0005845	-3141	-0.9022641	-0.9022804	+65	-0.3914129	-0.3914201	-80
22	+0.0081577	+0.0168995	3150	0.9022268	0.9021033	+14	0.3913970	0.3913434	102
23	0.0256406	0.0343800	3158	0.9019096	0.9016460	-37	0.3912593	0.3911449	125
24	0.0431171	0.0518511	3165	0.9013123	0.9009084	88	0.3910002	0.3908248	147
25	0.0605817	0.0693080	3171	0.9004343	0.8998899	140	0.3906191	0.3903829	170
26	+0.0780295	+0.0867451	-3176	-0.8992756	-0.8985918	-192	-0.3901160	-0.3898189	-193
27	0.0954542	0.1041563	3180	0.8978381	0.8970142	244	0.3894918	0.3891342	215
28	0.1128505	0.1215361	3182	0.8961198	0.8951552	296	0.3887460	0.3883271	238
29	0.1302124	0.1388789	3183	0.8941207	0.8930163	349	0.3878779	0.3873984	261
30	0.1475348	0.1561794	3182	0.8918421	0.8905981	402	0.3868887	0.3863489	284
31	+0.1648119	+0.1734318	-3181	-0.8892843	-0.8879011	-455	-0.3857785	-0.3851780	-307
32	+0.1820382	+0.1906298	-3178	-0.8864484	-0.8849264	-508	-0.3845475	-0.3838870	-330

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	149 43 57.1	-4 7 53.4	1.0	195 48 57.7	-5 9 9.0	1.0	205 38 14.8	-4 46 14.5
1.5	155 43 38.6	4 27 18.8	1.5	202 10 53.5	5 2 34.5	1.5	212 5 44.1	4 33 3.9
2.0	161 45 44.6	4 43 54.6	2.0	208 36 59.4	4 52 8.3	2.0	218 36 21.3	4 16 14.3
2.5	167 50 43.8	4 57 27.2	2.5	215 7 37.1	4 37 50.0	2.5	225 10 16.0	3 55 53.4
3.0	173 59 5.8	5 7 43.9	3.0	221 43 7.6	4 19 41.7	3.0	231 47 38.9	3 32 11.3
3.5	180 11 20.9	-5 14 32.8	3.5	228 23 50.9	-3 57 48.7	3.5	238 28 41.8	-3 5 21.6
4.0	186 27 59.4	5 17 42.7	4.0	235 10 4.7	3 32 19.6	4.0	245 13 37.1	2 35 40.8
4.5	192 49 31.1	5 17 3.1	4.5	242 2 3.3	3 3 26.8	4.5	252 2 36.4	2 3 29.0
5.0	199 16 24.8	5 12 25.3	5.0	248 59 56.3	2 31 27.4	5.0	258 55 50.3	1 29 9.5
5.5	205 49 6.7	5 3 42.1	5.5	256 3 47.3	1 56 43.2	5.5	265 53 26.6	0 53 9.1
6.0	212 28 0.0	-4 50 48.5	6.0	263 13 32.2	-1 19 41.5	6.0	272 55 29.4	-0 15 58.1
6.5	219 13 23.0	4 33 42.6	6.5	270 28 58.0	0 40 54.9	6.5	280 1 57.9	+0 21 49.8
7.0	226 5 28.4	4 12 26.3	7.0	277 49 41.8	-0 1 1.4	7.0	287 12 44.4	0 59 38.1
7.5	233 4 21.9	3 47 6.0	7.5	285 15 10.1	+0 39 16.6	7.5	294 27 33.9	1 36 47.9
8.0	240 10 0.6	3 17 53.5	8.0	292 44 38.2	1 19 13.1	8.0	301 46 2.3	2 12 38.6
8.5	247 22 11.9	-2 45 7.1	8.5	300 17 11.2	+1 58 0.1	8.5	309 7 36.6	+2 46 29.7
9.0	254 40 32.4	2 9 12.3	9.0	307 51 44.8	2 34 49.7	9.0	316 31 34.3	3 17 41.3
9.5	262 4 28.1	1 30 40.8	9.5	315 27 8.2	3 8 56.3	9.5	323 57 4.3	3 45 35.9
10.0	269 33 14.0	0 50 11.7	10.0	323 2 5.1	3 39 37.9	10.0	331 23 8.7	4 9 40.9
10.5	277 5 54.8	-0 8 29.6	10.5	330 35 18.8	4 6 19.2	10.5	338 48 44.0	4 29 28.8
11.0	284 41 26.0	+0 33 36.4	11.0	338 5 34.2	+4 28 32.6	11.0	346 12 44.4	+4 44 39.0
11.5	292 18 36.8	1 15 14.3	11.5	345 31 41.6	4 45 58.7	11.5	353 34 4.4	4 54 58.8
12.0	299 56 11.6	1 55 32.3	12.0	352 52 39.5	4 58 27.0	12.0	0 51 41.6	5 0 23.0
12.5	307 32 53.8	2 33 40.6	12.5	0 7 37.0	5 5 55.3	12.5	8 4 39.8	5 0 54.1
13.0	315 7 28.5	3 8 54.2	13.0	7 15 54.8	5 8 29.1	13.0	15 12 11.1	4 56 41.9
13.5	322 38 45.3	+3 40 34.0	13.5	14 17 6.3	+5 6 19.7	13.5	22 13 37.5	+4 48 1.7
14.0	330 5 41.1	4 8 8.8	14.0	21 10 57.3	4 59 43.4	14.0	29 8 32.1	4 35 13.4
14.5	337 27 22.5	4 31 15.7	14.5	27 57 25.3	4 48 59.9	14.5	35 56 38.8	4 18 40.4
15.0	344 43 6.4	4 49 40.2	15.0	34 36 38.2	4 34 31.4	15.0	42 37 53.1	3 58 48.0
15.5	351 52 21.7	5 3 15.3	15.5	41 8 52.8	4 16 40.9	15.5	49 12 20.3	3 36 2.5
16.0	358 54 48.5	+5 12 1.2	16.0	47 34 33.6	+3 55 51.8	16.0	55 40 14.8	+3 10 50.1
16.5	5 50 17.7	5 16 3.9	16.5	53 54 10.6	3 32 27.2	16.5	62 1 58.9	2 43 36.4
17.0	12 38 50.3	5 15 33.7	17.0	60 8 18.1	3 6 49.8	17.0	68 18 1.2	2 14 46.1
17.5	19 20 35.7	5 10 44.6	17.5	66 17 33.3	2 39 21.3	17.5	74 28 55.0	1 44 42.2
18.0	25 55 50.4	5 1 52.8	18.0	72 22 35.3	2 10 22.6	18.0	80 35 17.6	1 13 46.7
18.5	32 24 56.7	+4 49 16.4	18.5	78 24 3.9	+1 40 13.5	18.5	86 37 49.0	+0 42 20.0
19.0	38 48 20.9	4 33 14.5	19.0	84 22 38.5	1 9 13.4	19.0	92 37 10.7	+0 10 41.3
19.5	45 6 32.6	4 14 6.1	19.5	90 18 58.1	0 37 40.9	19.5	98 34 4.3	-0 20 51.3
20.0	51 20 2.9	3 52 10.8	20.0	96 13 39.9	+0 5 54.1	20.0	104 29 11.9	0 52 0.3
20.5	57 29 24.3	3 27 48.5	20.5	102 7 19.3	-0 25 48.9	20.5	110 23 14.6	1 22 28.9
21.0	63 35 8.8	+3 1 18.4	21.0	108 0 29.3	-0 57 10.5	21.0	116 16 52.1	-1 52 0.9
21.5	69 37 48.2	2 32 59.9	21.5	113 53 40.4	1 27 53.0	21.5	122 10 41.9	2 20 20.2
22.0	75 37 53.1	2 3 12.4	22.0	119 47 20.2	1 57 38.8	22.0	128 5 19.5	2 47 10.8
22.5	81 35 52.6	1 32 15.0	22.5	125 41 53.6	2 26 10.3	22.5	134 1 17.1	3 12 16.8
23.0	87 32 14.1	1 0 26.9	23.0	131 37 42.2	2 53 10.0	23.0	139 59 4.0	3 35 22.4
23.5	93 27 23.1	+0 28 7.4	23.5	137 35 4.5	-3 18 20.6	23.5	145 59 6.0	-3 56 11.9
24.0	99 21 43.0	-0 4 24.3	24.0	143 34 16.4	3 41 25.2	24.0	152 1 44.6	4 14 29.7
24.5	105 15 35.3	0 36 48.9	24.5	149 35 30.8	4 2 7.4	24.5	158 7 17.8	4 30 1.0
25.0	111 9 19.4	1 8 47.2	25.0	155 38 58.2	4 20 11.5	25.0	164 15 59.1	4 42 31.5
25.5	117 3 13.4	1 40 0.0	25.5	161 44 46.7	4 35 22.8	25.5	170 27 58.1	4 51 48.1
26.0	122 57 33.8	-2 10 8.7	26.0	167 53 2.6	-4 47 28.2	26.0	176 43 20.4	-4 57 38.9
26.5	128 52 35.5	2 38 54.7	26.5	174 3 51.0	4 56 15.9	26.5	183 2 7.9	4 59 54.7
27.0	134 48 32.5	3 6 0.0	27.0	180 17 15.7	5 1 35.8	27.0	189 24 19.2	4 58 27.5
27.5	140 45 38.3	3 31 7.2	27.5	186 33 20.4	5 3 20.1	27.5	195 49 49.9	4 53 12.7
28.0	146 44 5.7	3 53 59.9	28.0	192 52 8.8	5 1 23.2	28.0	202 18 33.6	4 44 8.5
28.5	152 44 7.9	-4 14 22.5	28.5	199 13 45.2	-4 55 41.5	28.5	208 50 22.5	-4 31 16.5
29.0	158 45 58.1	4 32 0.2	29.0	205 38 14.8	4 46 14.5	29.0	215 25 7.9	4 14 41.6
29.5	164 49 50.2	4 46 39.8	29.5	212 5 44.1	4 33 3.9	29.5	222 2 41.4	3 54 32.7
30.0	170 55 58.9	4 58 9.1	30.0	218 36 21.3	4 16 14.3	30.0	228 42 55.0	3 31 1.9
30.5	177 4 40.2	5 6 17.4	30.5	225 10 16.0	3 55 53.4	30.5	235 25 42.2	3 4 25.1
31.0	183 16 11.2	-5 10 55.1	31.0	231 47 38.9	-3 32 11.3	31.0	242 10 58.0	-2 35 1.4
31.5	189 30 50.5	-5 11 54.4	31.5	238 28 41.8	-3 5 21.6	31.5	248 58 39.5	-2 3 13.1

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	255 48 45.2	-1 29 25.6	1.0	294 30 40.0	+2 5 25.5	1.0	347 51 50.6	+5 8 57.9
1.5	262 41 15.5	0 54 6.4	1.5	301 35 18.6	2 39 15.2	1.5	354 49 24.9	5 14 26.2
2.0	269 36 11.3	-0 17 45.8	2.0	308 40 7.5	3 10 39.0	2.0	1 43 47.1	5 15 18.3
2.5	276 33 33.7	+0 19 4.4	2.5	315 44 56.0	3 39 7.2	2.5	8 34 51.4	5 11 39.7
3.0	283 33 23.6	0 55 50.8	3.0	322 49 33.0	4 4 13.0	3.0	15 22 33.1	5 3 40.0
3.5	290 35 40.0	+1 31 58.8	3.5	329 53 45.9	+4 25 33.4	3.5	22 6 48.7	+4 51 31.9
4.0	297 40 18.9	2 6 53.4	4.0	336 57 20.3	4 42 49.2	4.0	28 47 35.8	4 35 31.4
4.5	304 47 12.5	2 39 59.8	4.5	343 59 59.6	4 55 45.5	4.5	35 24 52.4	4 15 57.0
5.0	311 56 8.4	3 10 43.9	5.0	351 1 25.4	5 4 12.4	5.0	41 58 37.6	3 53 9.5
5.5	319 6 48.3	3 38 33.4	5.5	358 1 17.2	5 8 4.7	5.5	48 28 51.3	3 27 31.6
6.0	326 18 47.9	+4 2 58.6	6.0	4 59 12.7	+5 7 22.0	6.0	54 55 34.3	+2 59 27.4
6.5	333 31 36.9	4 23 32.9	6.5	11 54 48.7	5 2 8.7	6.5	61 18 48.3	2 29 21.7
7.0	340 44 39.1	4 39 54.9	7.0	18 47 41.7	4 52 34.2	7.0	67 38 36.9	1 57 40.2
7.5	347 57 13.7	4 51 46.9	7.5	25 37 28.7	4 38 52.5	7.5	73 55 4.9	1 24 48.3
8.0	355 8 36.4	4 58 59.4	8.0	32 23 48.2	4 21 20.9	8.0	80 8 18.8	0 51 11.3
8.5	2 18 0.9	+5 1 27.6	8.5	39 6 21.3	+4 0 20.5	8.5	86 18 27.2	+0 17 13.7
9.0	9 24 41.2	4 59 13.3	9.0	45 44 51.9	3 36 15.0	9.0	92 25 40.7	-0 16 40.7
9.5	16 27 53.2	4 52 24.8	9.5	52 19 8.0	3 9 29.8	9.5	98 30 12.0	0 50 9.5
10.0	23 26 56.9	4 41 16.1	10.0	58 49 2.2	2 40 31.4	10.0	104 32 16.3	1 22 51.5
10.5	30 21 18.1	4 26 5.3	10.5	65 14 31.5	2 9 47.2	10.5	110 32 11.0	1 54 27.1
11.0	37 10 29.6	+4 7 14.8	11.0	71 35 37.9	+1 37 44.0	11.0	116 30 15.8	-2 24 37.9
11.5	43 54 11.7	3 45 9.7	11.5	77 52 28.3	1 4 48.1	11.5	122 26 53.0	2 53 7.3
12.0	50 32 12.5	3 20 16.9	12.0	84 5 14.7	+0 31 24.6	12.0	128 22 26.7	3 19 39.8
12.5	57 4 29.5	2 53 3.6	12.5	90 14 13.3	-0 2 2.9	12.5	134 17 23.2	3 44 1.2
13.0	63 31 7.2	2 23 57.5	13.0	96 19 44.5	0 35 12.2	13.0	140 12 11.0	4 5 58.5
13.5	69 52 17.8	+1 53 25.1	13.5	102 22 12.6	-1 7 42.7	13.5	146 7 20.1	-4 25 19.6
14.0	76 8 20.0	1 21 51.7	14.0	108 22 5.0	1 39 15.6	14.0	152 3 22.2	4 41 53.1
14.5	82 19 38.5	0 49 41.3	14.5	114 19 52.2	2 9 33.4	14.5	158 0 50.1	4 55 28.6
15.0	88 26 42.5	+0 17 16.3	15.0	120 16 7.1	2 38 19.9	15.0	164 0 17.6	5 5 56.1
15.5	94 30 5.1	-0 15 2.8	15.5	126 11 24.4	3 5 20.2	15.5	170 2 18.7	5 13 6.3
16.0	100 30 22.6	-0 46 56.7	16.0	132 6 20.3	-3 30 20.0	16.0	176 7 27.5	-5 16 50.4
16.5	106 28 13.3	1 18 7.6	16.5	138 1 31.9	3 53 6.0	16.5	182 16 17.6	5 17 0.5
17.0	112 24 17.0	1 48 18.8	17.0	143 57 36.9	4 13 25.4	17.0	188 29 21.3	5 13 29.5
17.5	118 19 14.3	2 17 14.4	17.5	149 55 12.7	4 31 5.7	17.5	194 47 9.0	5 6 11.3
18.0	124 13 46.0	2 44 39.5	18.0	155 54 56.1	4 45 54.8	18.0	201 10 8.5	4 55 1.8
18.5	130 8 32.1	-3 10 19.2	18.5	161 57 23.0	-4 57 40.8	18.5	207 38 43.7	-4 39 58.7
19.0	136 4 11.7	3 33 59.1	19.0	168 3 7.1	5 6 12.2	19.0	214 13 14.2	4 21 2.7
19.5	142 1 22.2	3 55 25.0	19.5	174 12 40.0	5 11 18.2	19.5	220 53 54.0	3 58 17.8
20.0	148 0 38.8	4 14 23.0	20.0	180 26 30.1	5 12 48.6	20.0	227 40 50.7	3 31 52.1
20.5	154 2 33.9	4 30 39.2	20.5	186 45 1.8	5 10 34.4	20.5	234 34 4.6	3 1 58.8
21.0	160 7 36.5	-4 43 59.8	21.0	193 8 35.0	-5 4 28.2	21.0	241 33 28.2	-2 28 56.2
21.5	166 16 11.8	4 54 11.6	21.5	199 37 24.3	4 54 24.8	21.5	248 38 44.8	1 53 8.7
22.0	172 28 40.7	5 1 2.3	22.0	206 11 39.0	4 40 21.8	22.0	255 49 29.3	1 15 6.6
22.5	178 45 19.4	5 4 20.7	22.5	212 51 21.4	4 22 20.4	22.5	263 5 8.2	-0 35 25.8
23.0	185 6 19.0	5 3 56.8	23.0	219 36 27.5	4 0 25.6	23.0	270 24 59.6	+0 5 12.9
23.5	191 31 45.1	-4 59 43.2	23.5	226 26 46.7	-3 34 47.6	23.5	277 48 15.0	+0 46 4.9
24.0	198 1 38.3	4 51 34.9	24.0	233 22 1.8	3 5 41.6	24.0	285 14 0.5	1 26 23.4
24.5	204 35 53.8	4 39 30.2	24.5	240 21 49.4	2 33 28.5	24.5	292 41 17.9	2 5 20.9
25.0	211 14 22.2	4 23 31.1	25.0	247 25 40.6	1 58 34.3	25.0	300 9 7.5	2 42 12.3
25.5	217 56 49.8	4 3 43.7	25.5	254 33 2.0	1 21 30.4	25.5	307 36 29.8	3 16 14.5
26.0	224 42 59.0	-3 40 18.8	26.0	261 43 16.9	-0 42 52.5	26.0	315 2 27.7	+3 46 50.2
26.5	231 32 29.8	3 13 31.9	26.5	268 55 46.3	-0 3 19.7	26.5	322 26 8.1	4 13 28.1
27.0	238 25 0.3	2 43 42.5	27.0	276 9 50.2	+0 36 26.4	27.0	329 46 44.1	4 35 43.7
27.5	245 20 7.9	2 11 14.7	27.5	283 24 48.7	1 15 43.4	27.5	337 3 35.4	4 53 20.0
28.0	252 17 30.1	1 36 36.6	28.0	290 40 3.6	1 53 49.3	28.0	344 16 9.5	5 6 6.6
28.5	259 16 45.3	-1 0 19.6	28.5	297 54 59.1	+2 30 3.8	28.5	351 24 1.9	+5 14 0.2
29.0	266 17 33.2	-0 22 57.3	29.0	305 9 2.2	3 3 49.7	29.0	358 26 55.5	5 17 3.3
29.5	273 19 35.7	+0 14 54.8	29.5	312 21 43.5	3 34 33.7	29.5	5 24 40.6	5 15 23.3
30.0	280 22 36.8	0 52 40.1	30.0	319 32 37.2	4 1 47.2	30.0	12 17 14.0	5 9 12.1
30.5	287 26 22.4	1 29 42.3	30.5	326 41 21.4	4 25 6.2	30.5	19 4 38.2	4 58 44.9
31.0	294 30 40.0	+2 5 25.5	31.0	333 47 38.0	+4 44 12.2	31.0	25 47 0.1	+4 44 19.3
31.5	301 35 18.6	+2 39 15.2	31.5	340 51 11.8	+4 58 52.2	31.5	32 24 30.3	+4 26 15.3

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	25 47 0.1	+4 44 19.3	1.0	73 59 19.1	+1 20 31.1	1.0	119 4 32.6	-2 41 26.6
1.5	32 24 30.3	4 26 15.3	1.5	80 6 58.5	0 47 53.0	1.5	124 59 4.8	3 6 56.9
2.0	38 57 22.4	4 4 54.4	2.0	86 11 41.4	+0 14 59.1	2.0	130 53 28.5	3 30 23.6
2.5	45 25 51.6	3 40 39.0	2.5	92 13 55.0	-0 17 49.7	2.5	136 48 4.4	3 51 32.9
3.0	51 50 14.4	3 13 52.1	3.0	98 14 4.5	0 50 13.2	3.0	142 43 10.9	4 10 12.1
3.5	58 10 48.0	+2 44 57.2	3.5	104 12 33.4	-1 21 52.1	3.5	148 39 3.3	-4 26 9.4
4.0	64 27 49.5	2 14 18.2	4.0	110 9 42.9	1 52 27.9	4.0	154 35 55.0	4 39 14.1
4.5	70 41 35.7	1 42 18.8	4.5	116 5 52.5	2 21 42.7	4.5	160 33 57.5	4 49 16.8
5.0	76 52 23.3	1 9 22.9	5.0	122 1 19.9	2 49 19.4	5.0	166 33 20.5	4 56 9.4
5.5	83 0 28.3	0 35 53.6	5.5	127 56 21.0	3 15 2.0	5.5	172 34 12.9	4 59 45.6
6.0	89 6 5.8	+0 2 13.6	6.0	133 51 10.6	-3 38 35.5	6.0	178 36 43.0	-5 0 0.7
6.5	95 9 30.6	-0 31 14.7	6.5	139 46 2.6	3 59 46.1	6.5	184 40 59.0	4 56 51.7
7.0	101 10 57.5	1 4 10.1	7.0	145 41 10.3	4 18 21.1	7.0	190 47 9.6	4 50 17.7
7.5	107 10 40.7	1 36 12.1	7.5	151 36 46.6	4 34 8.8	7.5	196 55 24.4	4 40 19.6
8.0	113 8 54.4	2 7 1.4	8.0	157 33 4.7	4 46 59.5	8.0	203 5 54.3	4 27 0.5
8.5	119 5 53.6	-2 36 19.8	8.5	163 30 18.3	-4 56 44.6	8.5	209 18 51.8	-4 10 25.5
9.0	125 1 53.4	3 3 50.5	9.0	169 28 42.1	5 3 16.7	9.0	215 34 31.8	3 50 41.6
9.5	130 57 10.1	3 29 17.8	9.5	175 28 32.0	5 6 30.0	9.5	221 53 10.9	3 27 58.1
10.0	136 52 0.6	3 52 27.4	10.0	181 30 5.6	5 6 20.3	10.0	228 15 7.6	3 2 26.5
10.5	142 46 43.6	4 13 6.4	10.5	187 33 42.0	5 2 44.6	10.5	234 40 42.3	2 34 20.6
11.0	148 41 39.0	-4 31 2.9	11.0	193 39 42.3	-4 55 41.4	11.0	241 10 16.7	-2 3 56.3
11.5	154 37 8.1	4 46 6.5	11.5	199 48 29.7	4 45 10.9	11.5	247 44 13.1	1 31 32.4
12.0	160 33 34.3	4 58 7.7	12.0	206 0 28.9	4 31 14.7	12.0	254 22 53.9	0 57 30.2
12.5	166 31 22.4	5 6 58.1	12.5	212 16 6.2	4 13 56.0	12.5	261 6 40.3	-0 22 13.7
13.0	172 30 59.2	5 12 30.6	13.0	218 35 48.8	3 53 20.2	13.0	267 55 51.0	+0 13 49.8
13.5	178 32 52.7	-5 14 38.6	13.5	225 0 4.9	-3 29 34.7	13.5	274 50 40.7	+0 50 10.4
14.0	184 37 32.2	5 13 16.7	14.0	231 29 22.7	3 2 49.4	14.0	281 51 18.8	1 26 15.1
14.5	190 45 28.4	5 8 20.6	14.5	238 4 8.9	2 33 16.8	14.5	288 57 47.2	2 1 28.2
15.0	196 57 12.5	4 59 47.2	15.0	244 44 48.3	2 1 13.2	15.0	296 9 59.4	2 35 12.0
15.5	203 13 15.4	4 47 34.7	15.5	251 31 42.4	1 26 58.2	15.5	303 27 38.2	3 6 47.7
16.0	209 34 7.9	-4 31 43.0	16.0	258 25 7.7	-0 50 55.7	16.0	310 50 15.1	+3 35 36.4
16.5	216 0 19.1	4 12 14.2	16.5	265 25 14.2	-0 13 33.8	16.5	318 17 9.6	4 1 0.6
17.0	222 32 16.0	3 49 12.8	17.0	272 32 3.5	+0 24 34.6	17.0	325 47 29.4	4 22 25.7
17.5	229 10 22.6	3 22 46.6	17.5	279 45 27.5	1 2 52.5	17.5	333 20 12.0	4 39 22.2
18.0	235 54 57.8	2 53 7.3	18.0	287 5 6.4	1 40 38.8	18.0	340 54 6.3	4 51 27.0
18.5	242 46 14.7	-2 20 30.8	18.5	294 30 28.3	+2 17 9.9	18.5	348 27 55.0	+4 58 24.7
19.0	249 44 19.3	1 45 18.3	19.0	302 0 48.4	2 51 40.7	19.0	356 0 19.1	5 0 8.6
19.5	256 49 9.1	1 7 56.1	19.5	309 35 9.7	3 23 26.2	19.5	3 30 1.1	4 56 40.9
20.0	264 0 31.6	-0 28 56.4	20.0	317 12 23.8	3 51 44.3	20.0	10 55 48.2	4 48 12.3
20.5	271 18 3.7	+0 11 3.3	20.5	324 51 13.6	4 15 57.1	20.5	18 16 36.2	4 35 1.1
21.0	278 41 11.2	+0 51 20.7	21.0	332 30 16.3	+4 35 33.6	21.0	25 31 31.4	+4 17 31.6
21.5	286 9 8.4	1 31 9.4	21.5	340 8 6.9	4 50 11.0	21.5	32 39 52.7	3 56 13.0
22.0	293 40 59.7	2 9 41.7	22.0	347 43 22.4	4 59 35.4	22.0	39 41 11.9	3 31 37.0
22.5	301 15 40.0	2 46 9.1	22.5	355 14 45.3	5 3 42.4	22.5	46 35 13.6	3 4 16.9
23.0	308 51 57.5	3 19 45.4	23.0	2 41 7.3	5 2 36.7	23.0	53 21 54.6	2 34 46.0
23.5	316 28 36.3	+3 49 48.5	23.5	10 1 32.0	+4 56 30.9	23.5	60 1 22.7	+2 3 36.3
24.0	324 4 19.3	4 15 42.8	24.0	17 15 15.4	4 45 44.2	24.0	66 33 54.9	1 31 18.2
24.5	331 37 51.7	4 36 59.9	24.5	24 21 47.9	4 30 40.7	24.5	72 59 55.8	0 58 20.1
25.0	339 8 4.0	4 53 20.5	25.0	31 20 53.2	4 11 47.7	25.0	79 19 56.1	+0 25 7.7
25.5	346 33 54.7	5 4 33.7	25.5	38 12 27.5	3 49 34.6	25.5	85 34 30.6	-0 7 55.7
26.0	353 54 32.0	+5 10 37.3	26.0	44 56 38.3	+3 24 31.1	26.0	91 44 17.3	-0 40 28.6
26.5	1 9 15.8	5 11 36.4	26.5	51 33 42.1	2 57 6.9	26.5	97 49 56.3	1 12 11.9
27.0	8 17 37.6	5 7 43.3	27.0	58 4 3.1	2 27 50.3	27.0	103 52 7.8	1 42 48.0
27.5	15 19 20.3	4 59 14.3	27.5	64 28 11.1	1 57 8.5	27.5	109 51 32.2	2 12 0.9
28.0	22 14 17.9	4 46 30.1	28.0	70 46 39.9	1 25 26.8	28.0	115 48 49.1	2 39 35.8
28.5	29 2 33.4	+4 29 54.1	28.5	77 0 5.9	+0 53 9.1	28.5	121 44 36.3	-3 5 18.7
29.0	35 44 18.3	4 9 50.9	29.0	83 9 6.8	+0 20 37.3	29.0	127 39 29.9	3 28 56.5
29.5	42 19 50.4	3 46 46.0	29.5	89 14 20.7	-0 11 47.6	29.5	133 34 3.3	3 50 17.0
30.0	48 49 32.7	3 21 4.7	30.0	95 16 24.8	0 43 46.3	30.0	139 28 47.3	4 9 8.2
30.5	55 13 51.6	2 53 12.3	30.5	101 15 55.0	1 15 0.6	30.5	145 24 9.4	4 25 19.2
31.0	61 33 15.6	+2 23 33.4	31.0	107 13 25.5	-1 45 13.0	31.0	151 20 34.1	-4 38 39.6
31.5	67 48 14.7	+1 52 32.0	31.5	113 9 28.3	-2 14 6.9	31.5	157 18 22.6	-4 48 59.7

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	151° 20' 34.1	-4° 38' 39.6	1.0	196° 9' 11.2	-4° 39' 31.1	1.0	229° 59' 43.1	-2° 39' 51.6
1.5	157 18 22.6	4 48 59.7	1.5	202 26 17.6	4 23 31.1	1.5	236 39 36.7	2 7 1.8
2.0	163 17 52.6	4 56 11.1	2.0	208 46 54.7	4 4 6.8	2.0	243 24 7.9	1 32 2.4
2.5	169 19 18.5	5 0 6.5	2.5	215 11 2.7	3 41 26.6	2.5	250 13 3.1	0 55 20.7
3.0	175 22 52.1	5 0 40.1	3.0	221 38 39.0	3 15 42.6	3.0	257 6 4.1	-0 17 27.7
3.5	181 28 42.0	-4 57 47.7	3.5	228 9 38.9	-2 47 10.2	3.5	264 2 48.6	+0 21 1.9
4.0	187 36 54.7	4 51 27.2	4.0	234 43 55.4	2 16 8.2	4.0	271 2 51.1	0 59 31.1
4.5	193 47 34.5	4 41 38.8	4.5	241 21 20.5	1 42 59.1	4.5	278 5 43.2	1 37 21.7
5.0	200 0 44.1	4 28 24.8	5.0	248 1 45.2	1 8 8.0	5.0	285 10 54.4	2 13 55.0
5.5	206 16 25.9	4 11 50.4	5.5	254 45 0.6	-0 32 2.8	5.5	292 17 54.3	2 48 32.9
6.0	212 34 41.5	-3 52 3.1	6.0	261 30 58.3	+0 4 46.1	6.0	299 26 11.6	+3 20 39.3
6.5	218 55 32.8	3 29 13.7	6.5	268 19 30.1	0 41 46.8	6.5	306 35 16.3	3 49 40.8
7.0	225 19 2.8	3 3 34.7	7.0	275 10 28.8	1 18 26.4	7.0	313 44 39.6	4 15 8.0
7.5	231 45 15.4	2 35 22.4	7.5	282 3 47.9	1 54 11.1	7.5	320 53 54.7	4 36 36.1
8.0	238 14 15.9	2 4 54.7	8.0	288 59 21.4	2 28 27.8	8.0	328 2 37.4	4 53 44.9
8.5	244 46 11.7	-1 32 32.6	8.5	295 57 3.7	+3 0 43.6	8.5	335 10 25.5	+5 6 19.3
9.0	251 21 11.8	0 58 39.0	9.0	302 56 48.9	3 30 27.2	9.0	342 16 59.5	5 14 9.7
9.5	257 59 26.2	-0 23 39.0	9.5	309 58 30.1	3 57 8.9	9.5	349 22 1.8	5 17 11.7
10.0	264 41 6.5	+0 12 0.5	10.0	317 1 59.1	4 20 21.8	10.0	356 25 17.6	5 15 25.8
10.5	271 26 24.2	0 47 50.1	10.5	324 7 5.2	4 39 41.6	10.5	3 26 33.1	5 8 57.4
11.0	278 15 30.5	+1 23 20.1	11.0	331 13 35.1	+4 54 47.6	11.0	10 25 37.1	+4 57 56.2
11.5	285 8 35.1	1 57 58.4	11.5	338 21 12.6	5 5 23.4	11.5	17 22 18.3	4 42 36.6
12.0	292 5 44.9	2 31 12.5	12.0	345 29 37.4	5 11 17.1	12.0	24 16 27.0	4 23 16.2
12.5	299 7 2.5	3 2 29.3	12.5	352 38 25.7	5 12 21.4	12.5	31 7 54.3	4 0 16.3
13.0	306 12 25.8	3 31 15.5	13.0	359 47 10.3	5 8 34.9	13.0	37 56 31.2	3 34 0.8
13.5	313 21 45.9	+3 56 59.2	13.5	6 55 20.7	+5 0 2.0	13.5	44 42 10.1	+3 4 56.4
14.0	320 34 46.1	4 19 9.2	14.0	14 2 24.1	4 46 52.1	14.0	51 24 43.1	2 33 31.1
14.5	327 51 1.5	4 37 18.3	14.5	21 7 46.2	4 29 20.4	14.5	58 4 3.2	2 0 15.2
15.0	335 9 58.9	4 51 2.4	15.0	28 10 52.7	4 7 47.4	15.0	64 40 4.5	1 25 38.6
15.5	342 30 56.6	5 0 2.5	15.5	35 11 9.9	3 42 37.9	15.5	71 12 41.8	0 50 11.5
16.0	349 53 5.1	+5 4 5.7	16.0	42 8 6.0	+3 14 20.5	16.0	77 41 51.2	+0 14 23.9
16.5	357 15 29.2	5 3 5.9	16.5	49 1 12.9	2 43 26.4	16.5	84 7 30.8	-0 21 15.2
17.0	4 37 10.2	4 57 4.7	17.0	55 50 6.3	2 10 28.5	17.0	90 29 40.3	0 56 18.5
17.5	11 57 7.4	4 46 10.7	17.5	62 34 26.8	1 36 0.6	17.5	96 48 21.8	1 30 20.6
18.0	19 14 21.4	4 30 39.9	18.0	69 14 1.0	1 0 35.7	18.0	103 3 40.0	2 2 58.4
18.5	26 27 56.7	+4 10 54.5	18.5	75 48 41.0	+0 24 46.1	18.5	109 15 42.0	-2 33 50.8
19.0	33 37 3.5	3 47 22.1	19.0	82 18 24.5	-0 10 57.8	19.0	115 24 37.9	3 2 39.5
19.5	40 41 0.0	3 20 34.0	19.5	88 43 15.6	0 46 8.3	19.5	121 30 40.5	3 29 8.5
20.0	47 39 13.5	2 51 4.0	20.0	95 3 23.5	1 20 19.8	20.0	127 34 5.6	3 53 3.9
20.5	54 31 21.2	2 19 26.6	20.5	101 19 2.8	1 53 9.8	20.5	133 35 12.0	4 14 14.5
21.0	61 17 10.0	+1 46 16.6	21.0	107 30 32.4	-2 24 18.6	21.0	139 34 21.2	-4 32 30.6
21.5	67 56 36.3	1 12 7.1	21.5	113 38 15.7	2 53 28.8	21.5	145 31 57.5	4 47 44.3
22.0	74 29 46.3	0 37 29.2	22.0	119 42 39.5	3 20 25.6	22.0	151 28 27.3	4 59 49.5
22.5	80 56 53.0	+0 2 51.7	22.5	125 44 13.4	3 44 56.3	22.5	157 24 19.8	5 8 40.6
23.0	87 18 17.0	-0 31 19.6	23.0	131 43 29.4	4 6 49.8	23.0	163 20 6.0	5 14 14.1
23.5	93 34 24.4	-1 4 41.3	23.5	137 41 1.7	-4 25 56.5	23.5	169 16 18.7	-5 16 26.6
24.0	99 45 45.9	1 36 52.9	24.0	143 37 25.6	4 42 8.2	24.0	175 13 32.0	5 15 16.0
24.5	105 52 55.5	2 7 36.5	24.5	149 33 17.4	4 55 17.2	24.5	181 12 20.9	5 10 40.6
25.0	111 56 30.0	2 36 36.0	25.0	155 29 13.6	5 5 17.4	25.0	187 13 21.0	5 2 39.7
25.5	117 57 7.6	3 3 37.1	25.5	161 25 50.6	5 12 2.7	25.5	193 17 7.9	4 51 13.5
26.0	123 55 27.2	-3 28 27.1	26.0	167 23 44.2	-5 15 27.9	26.0	199 24 16.8	-4 36 23.5
26.5	129 52 8.1	3 50 54.7	26.5	173 23 29.0	5 15 28.6	26.5	205 35 21.5	4 18 12.3
27.0	135 47 49.0	4 10 49.2	27.0	179 25 38.1	5 12 0.8	27.0	211 50 54.2	3 56 44.5
27.5	141 43 7.5	4 28 0.7	27.5	185 30 42.4	5 5 1.9	27.5	218 11 24.0	3 32 6.9
28.0	147 38 39.5	4 42 20.2	28.0	191 39 10.0	4 54 30.3	28.0	224 37 16.5	3 4 28.9
28.5	153 34 59.2	-4 53 39.3	28.5	197 51 26.2	-4 40 26.2	28.5	231 8 52.9	-2 34 3.6
29.0	159 32 38.2	5 1 49.8	29.0	204 7 52.0	4 22 51.7	29.0	237 46 28.9	2 1 7.3
29.5	165 32 5.2	5 6 44.7	29.5	210 28 44.8	4 1 51.6	29.5	244 30 13.2	1 26 1.0
30.0	171 33 45.8	5 8 17.7	30.0	216 54 16.8	3 37 33.6	30.0	251 20 7.6	0 49 10.1
30.5	177 38 2.0	5 6 23.7	30.5	223 24 35.5	3 10 8.6	30.5	258 16 5.2	-0 11 4.4
31.0	183 45 12.4	-5 0 58.8	31.0	229 59 43.1	-2 39 51.6	31.0	265 17 50.9	+0 27 41.8
31.5	189 55 31.8	-4 52 1.2	31.5	236 39 36.7	-2 7 1.8	31.5	272 25 0.3	+1 6 30.2

FOR GREENWICH MEAN NOON.						
Date.	THE MOON'S EQUATOR.			☾ Mean Longitude of the Moon.	Mean Solar Days.	Motion of ☾
	i Inclination to the Earth's Equator.	Δ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	Ω' Ascending Node on Earth's Equator.			
Jan. 0	23 16.6	95 6.6	3 42.3	141 3.6	0.1	1 19.06
	23 17.4	94 34.7	3 42.4	272 49.4	0.2	2 38.12
	23 18.2	94 2.8	3 42.5	44 35.3	0.3	3 57.18
	23 19.0	93 30.8	3 42.6	176 21.1	0.4	5 16.23
Feb. 9	23 19.8	92 58.9	3 42.8	308 6.9	0.5	6 35.29
March 19	23 20.6	92 26.9	3 43.0	79 52.8	0.6	7 54.35
	23 21.4	91 55.1	3 43.0	211 38.6	0.7	9 13.41
	23 22.2	91 23.2	3 43.1	343 24.4	0.8	10 32.47
	23 23.0	90 51.4	3 43.1	115 10.3	0.9	11 51.53
	23 23.9	90 19.5	3 43.2	246 56.1	1.0	13 10.58
April 10	23 24.8	89 47.8	3 43.3	18 41.9	2.0	26 21.17
	23 25.6	89 16.1	3 43.3	150 27.8	3.0	39 31.75
	23 26.4	88 44.4	3 43.2	282 13.6	4.0	52 42.33
May 10	23 27.2	88 12.6	3 43.2	53 59.5	5.0	65 52.92
	23 28.0	87 40.9	3 43.1	185 45.3	6.0	79 3.50
					7.0	92 14.09
June 30	23 28.8	87 9.1	3 43.0	317 31.1	8.0	105 24.67
	23 29.7	86 37.5	3 42.8	89 17.0	9.0	118 35.25
	23 30.5	86 5.9	3 42.7	221 2.8	10.0	131 45.84
	23 31.3	85 34.3	3 42.5	352 48.6		
July 9	23 32.1	85 2.7	3 42.4	124 34.5	Hours	0 32.94
Aug. 19	23 33.0	84 31.1	3 42.2	256 20.3	1	1 5.88
	23 33.8	83 59.6	3 42.0	28 6.1	2	1 38.82
	23 34.6	83 28.1	3 41.8	159 52.0	3	2 11.76
	23 35.4	82 56.5	3 41.5	291 37.8	4	2 44.70
	23 36.2	82 24.9	3 41.3	63 23.7	5	3 17.65
Sept. 7	23 37.1	81 53.4	3 41.0	195 9.5	6	3 50.59
	23 37.9	81 22.0	3 40.6	326 55.3	7	4 23.53
	23 38.7	80 50.5	3 40.1	98 41.2	8	4 56.47
	23 39.6	80 19.1	3 39.7	230 27.0	9	5 29.41
Oct. 17	23 40.4	79 47.6	3 39.4	2 12.8	10	6 2.35
Nov. 27	23 41.2	79 16.1	3 39.1	133 58.7	11	6 35.29
	23 42.0	78 44.8	3 38.7	265 44.5	12	7 8.23
	23 42.8	78 13.4	3 38.2	37 30.4	13	7 41.17
	23 43.6	77 42.1	3 37.8	169 16.2	14	8 14.11
Dec. 6	23 44.4	77 10.8	3 37.4	301 2.0	15	8 47.06
16	23 45.2	76 39.5	3 37.0	72 47.9	16	9 20.00
	23 46.0	76 8.1	3 36.6	204 33.7	17	9 52.94
	23 46.8	75 36.8	3 36.2	336 19.6	18	10 25.88
26					19	10 58.82
					20	11 31.76
36					21	12 4.70
					22	12 37.64

TABLE FOR THE LIBRATION OF THE MOON.

Argument,  $(\Omega - \lambda)$  or  $(\Omega - \lambda - 180^\circ)$ .

$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$		$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$	
0	0.0	39	0 0.0	180	46	0.6	56	1 3.9	134
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					
	$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$		$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$

 $\Delta \lambda$  has the sign of  $\tan (\lambda - \Omega)$  $a$  has the sign of  $\cos (\Omega - \lambda)$  $B$  has the sign of  $\sin (\Omega - \lambda)$



FOR GREENWICH MEAN NOON.									
Date.		Apparent Obliquity of the Ecliptic. (HANSEN.)		Equation of Equinoxes. (HANSEN.)		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
				In Longitude.	In R. A.		Aberration.	Hor. Par.	
Jan.	0	23 27	9.44	+ 17.48	+ 1.069	0.00	- 20.79	9.00	278 30.5
	10		9.45	17.90	1.095	1.38	20.79	9.00	277 58.8
	20		9.51	18.19	1.113	2.75	20.77	8.99	277 27.0
	30		9.59	18.36	1.123	4.13	20.75	8.98	276 55.2
Feb.	9		9.69	18.38	1.124	5.50	20.71	8.96	276 23.4
	19	23 27	9.76	+ 18.25	+ 1.116	6.88	- 20.67	8.94	275 51.7
Mar.	1		9.79	17.98	1.100	8.26	20.62	8.92	275 19.9
	11		9.78	17.62	1.078	9.63	20.57	8.90	274 48.1
	21		9.70	17.21	1.053	11.01	20.51	8.88	274 16.4
	31		9.56	16.79	1.027	12.38	20.45	8.85	273 44.6
April	10	23 27	9.35	+ 16.45	+ 1.006	13.76	- 20.39	8.82	273 12.8
	20		9.11	16.20	0.991	15.14	20.33	8.80	272 41.0
	30		8.83	16.07	0.983	16.51	20.28	8.78	272 9.3
May	10		8.56	16.07	0.983	17.89	20.23	8.76	271 37.5
	20		8.29	16.21	0.991	19.26	20.19	8.74	271 5.7
	30	23 27	8.07	+ 16.47	+ 1.007	20.64	- 20.16	8.72	270 33.9
June	9		7.87	16.83	1.029	22.02	20.13	8.71	270 2.2
	19		7.73	17.23	1.054	23.39	20.12	8.71	269 30.4
	29		7.67	17.63	1.078	24.77	20.11	8.70	268 58.6
July	9		7.65	18.00	1.101	26.14	20.11	8.70	268 26.9
	19	23 27	7.69	+ 18.30	+ 1.119	27.52	- 20.12	8.71	267 55.1
	29		7.74	18.47	1.130	28.90	20.14	8.72	267 23.3
Aug.	8		7.82	18.53	1.133	30.27	20.17	8.73	266 51.5
	18		7.90	18.46	1.129	31.65	20.21	8.75	266 19.8
	28		7.96	18.25	1.116	33.02	20.25	8.77	265 48.0
Sept.	7	23 27	7.96	+ 17.92	+ 1.096	34.40	- 20.30	8.79	265 16.2
	17		7.92	17.54	1.073	35.78	20.36	8.81	264 44.5
	27		7.81	17.09	1.045	37.15	20.41	8.83	264 12.7
Oct.	7		7.63	16.67	1.020	38.53	20.47	8.86	263 40.9
	17		7.42	16.30	0.997	39.90	20.53	8.89	263 9.1
	27	23 27	7.16	+ 16.04	+ 0.981	41.28	- 20.59	8.91	262 37.4
Nov.	6		6.88	15.94	0.975	42.66	20.64	8.93	262 5.6
	16		6.61	15.99	0.978	44.03	20.69	8.95	261 33.8
	26		6.35	16.19	0.990	45.41	20.73	8.97	261 2.0
Dec.	6		6.14	16.48	1.008	46.78	20.76	8.98	260 30.3
	16	23 27	5.98	+ 16.86	+ 1.031	48.16	- 20.78	8.99	259 58.5
	26		5.89	17.29	1.057	49.54	20.79	9.00	259 26.7
	36	23 27	5.85	+ 17.68	+ 1.081	50.91	- 20.79	9.00	258 55.0
Mean Obliquity, 1899.0, 23° 27' 8".49 (HANSEN).									
Mean Obliquity, 1899.0, 23° 27' 8".22 (PETERS).									
Precession for 1899 . . . . .						50".2636	log = 1.70125	Daily Motion	
Precession in a Solar Day . . . . .						0".1376	log = 9.13867	of $\Omega$	
Precession in a Sidereal Day . . . . .						0".1372	log = 9.13748	-3'.177	
Sun's Mean Equatorial Horizontal Parallax . . . . .						8".848	log = 0.94685		

PART II

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ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF WASHINGTON

FORMULÆ FOR THE REDUCTION OF THE POSITIONS OF THE FIXED STARS, USING THE NOTATION OF BESSEL, AND THE CONSTANTS OF PETERS AND STRUVE.

NOTATION.

- $\tau$ , the time, reckoned in units of one year, from the beginning of the Besselian fictitious year, (1898, December 30<sup>d</sup>.860 = 1899, January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington mean time),  
 $\alpha_0, \delta_0$ , the star's mean right ascension and declination at the beginning of the fictitious year,  
 $\alpha, \delta$ , the star's apparent right ascension and declination at the time  $\tau$ ,  
 $\mu, \mu'$ , the annual proper motion in right ascension and declination,  
 $\odot$ , the sun's true longitude,  
 $\Omega$ , the longitude of the moon's ascending node,  
 $\omega$ , the obliquity of the ecliptic,  
 $\Gamma$ , the longitude of the sun's perigee,  
 $\Gamma'$ , the longitude of the moon's perigee,  
 $\zeta$ , the moon's mean longitude.

BESSELIAN STAR-NUMBERS.

$$\begin{aligned} A = & \tau - 0.34252 \sin \Omega & - 0.00011 \sin (3 \odot - \Gamma) \\ & + 0.00410 \sin 2 \Omega & - 0.00005 \sin 2 (\odot - \Omega) \\ & - 0.02519 \sin 2 \odot & + 0.00010 \sin 2 (\odot - \Gamma') \\ & + 0.00293 \sin (\odot + 81^\circ 58') & + 0.00009 \sin (2 \Gamma' - \Omega) \\ & + 0.00025 \sin (2 \odot - \Omega) & + 0.00005 \cos \Gamma' \\ & - 0.00405 \sin 2 \zeta & + 0.00004 \sin 2 \Gamma' \\ & + 0.00135 \sin (\zeta - \Gamma') \\ B = & - 9''.2240 \cos \Omega & - 0''.0027 \cos (3 \odot - \Gamma) \\ & + 0.0895 \cos 2 \Omega & + 0.0067 \cos 2 (\odot - \Omega) \\ & - 0.5506 \cos 2 \odot & + 0.0024 \cos (2 \Gamma' - \Omega) \\ & - 0.0092 \cos (\odot + 281^\circ 12') & - 0.0023 \sin \Gamma' \\ & - 0.0886 \cos 2 \zeta & + 0.0008 \cos 2 \Gamma' \end{aligned}$$

$$C = -20''.4451 \cos \omega \cos \odot$$

$$D = -20''.4451 \sin \odot$$

$$E = -0.0450 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0032 \sin 2 \odot$$

BESSEL'S Star-Constants.

$$a = 3''.07270 + 1''.33681 \sin \alpha_0 \tan \delta_0 = \text{precession in right ascension}$$

$$b = \frac{1}{15} \cos \alpha_0 \tan \delta_0$$

$$c = \frac{1}{15} \cos \alpha_0 \sec \delta_0$$

$$d = \frac{1}{15} \sin \alpha_0 \sec \delta_0$$

$$a' = 20''.0522 \cos \alpha_0 = \text{precession in declination}$$

$$b' = -\sin \alpha_0$$

$$c' = \tan \omega \cos \delta_0 - \sin \alpha_0 \sin \delta_0$$

$$d' = \cos \alpha_0 \sin \delta_0$$

Reduction to Apparent Position.

$$\alpha = \alpha_0 + \tau \mu + Aa + Bb + Cc + Dd + \frac{1}{15} E \quad (\text{in time})$$

$$\delta = \delta_0 + \tau \mu' + Aa' + Bb' + Cc' + Dd' \quad (\text{in arc})$$

INDEPENDENT STAR-NUMBERS.

$$f = 46''.0905 A + E \quad (\text{in arc}) = 3''.07270 A + \frac{1}{15} E \quad (\text{in time})$$

$$g \sin G = B$$

$$h \sin H = C$$

$$i = C \tan \omega$$

$$g \cos G = 20''.0522 A$$

$$h \cos H = D$$

Reduction to Apparent Position.

$$\alpha = \alpha_0 + f + \tau \mu + \frac{1}{15} g \sin (G + \alpha_0) \tan \delta_0 + \frac{1}{15} h \sin (H + \alpha_0) \sec \delta_0 \quad (\text{in time})$$

$$\delta = \delta_0 + \tau \mu' + g \cos (G + \alpha_0) + h \cos (H + \alpha_0) \sin \delta_0 + i \cos \delta_0 \quad (\text{in arc})$$

NOTES.—(1) The independent star-numbers are more convenient, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy. Otherwise, the Besselian star-numbers are more convenient.

(2) In using the star-constants of the *British Association Catalogue*,  $a, b, c, d, a', b', c', d'$ , must be changed to  $c, d, a, b, -c', -d', -a', -b'$ , respectively.

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	
Jan. 0	+9.5455	-9.9862	-0.5386	+1.3031	Feb. 15	+9.6902	-0.1173	-1.1984	+1.0425	
1	9.5482	9.9986	0.5779	1.3016	16	9.6921	0.1068	1.2032	1.0302	
2	9.5503	0.0043	0.6138	1.2999	17	9.6948	0.0972	1.2078	1.0175	
3	9.5524	0.0025	0.6467	1.2981	18	9.6979	0.0909	1.2122	1.0044	
h	4	9.5549	9.9932	0.6774	1.2961	(10.0) 19	9.7013	0.0903	1.2165	0.9909
(7.0) 5	+9.5582	-9.9783	-0.7059	+1.2940	20	+9.7046	-0.0959	-1.2206	+0.9769	
6	9.5624	9.9605	0.7324	1.2917	21	9.7076	0.1070	1.2245	0.9621	
7	9.5677	9.9437	0.7573	1.2893	22	9.7099	0.1215	1.2283	0.9465	
8	9.5737	9.9320	0.7807	1.2868	23	9.7115	0.1366	1.2319	0.9301	
9	9.5801	9.9287	0.8028	1.2841	24	9.7124	0.1498	1.2353	0.9129	
10	+9.5865	-9.9351	-0.8237	+1.2813	25	+9.7129	-0.1587	-1.2385	+0.8950	
11	9.5924	9.9498	0.8437	1.2783	26	9.7130	0.1625	1.2416	0.8762	
12	9.5975	9.9696	0.8627	1.2751	27	9.7132	0.1604	1.2445	0.8564	
13	9.6016	9.9911	0.8807	1.2718	28	9.7138	0.1534	1.2473	0.8355	
14	9.6047	0.0091	0.8976	1.2683	Mar. 1	9.7151	0.1428	1.2499	0.8135	
15	+9.6070	-0.0221	-0.9135	+1.2646	2	+9.7170	-0.1313	-1.2524	+0.7903	
16	9.6088	0.0282	0.9290	1.2607	3	9.7197	0.1208	1.2547	0.7655	
17	9.6106	0.0265	0.9439	1.2566	4	9.7228	0.1146	1.2569	0.7391	
18	9.6127	0.0189	0.9582	1.2524	h	5	9.7262	0.1134	1.2589	0.7110
19	9.6155	0.0067	0.9719	1.2480	(11.0) 6	9.7294	0.1185	1.2608	0.6807	
h	20	+9.6190	-9.9931	-0.9849	+1.2434	7	+9.7323	-0.1282	-1.2626	+0.6480
(8.0) 21	9.6232	9.9818	0.9975	1.2387	8	9.7346	0.1404	1.2642	0.6125	
22	9.6279	9.9761	1.0096	1.2338	9	9.7362	0.1525	1.2657	0.5738	
23	9.6327	9.9786	1.0212	1.2287	10	9.7371	0.1618	1.2671	0.5312	
24	9.6373	9.9899	1.0324	1.2235	11	9.7375	0.1666	1.2683	0.4837	
25	+9.6413	-0.0066	-1.0431	+1.2181	12	+9.7376	-0.1657	-1.2694	+0.4303	
26	9.6446	0.0272	1.0535	1.2125	13	9.7380	0.1591	1.2704	0.3693	
27	9.6470	0.0472	1.0636	1.2066	14	9.7386	0.1477	1.2712	0.2983	
28	9.6487	0.0639	1.0733	1.2004	15	9.7398	0.1336	1.2718	0.2132	
29	9.6498	0.0749	1.0825	1.1940	16	9.7416	0.1193	1.2723	0.1071	
30	+9.6508	-0.0792	-1.0914	+1.1873	17	+9.7439	-0.1074	-1.2727	+9.9662	
31	9.6519	0.0772	1.1000	1.1804	18	9.7466	0.1003	1.2730	9.7565	
Feb. 1	9.6536	0.0700	1.1083	1.1733	19	9.7493	0.0986	1.2731	+9.3353	
2	9.6560	0.0591	1.1164	1.1660	h	20	9.7518	0.1026	1.2731	-9.1384
3	9.6592	0.0484	1.1242	1.1584	(12.0) 21	9.7538	0.1109	1.2730	9.6916	
h	4	+9.6632	-0.0407	-1.1317	+1.1506	22	+9.7552	-0.1210	-1.2728	-9.9268
(9.0) 5	9.6676	0.0387	1.1390	1.1425	23	9.7560	0.1301	1.2725	0.0784	
6	9.6721	0.0440	1.1460	1.1341	24	9.7562	0.1358	1.2720	0.1904	
7	9.6764	0.0558	1.1527	1.1253	25	9.7561	0.1362	1.2713	0.2795	
8	9.6801	0.0724	1.1592	1.1162	26	9.7560	0.1307	1.2705	0.3528	
9	+9.6830	-0.0906	-1.1654	+1.1068	27	+9.7563	-0.1190	-1.2696	-0.4153	
10	9.6850	0.1075	1.1714	1.0971	28	9.7571	0.1027	1.2686	0.4701	
11	9.6864	0.1206	1.1772	1.0870	29	9.7585	0.0838	1.2674	0.5186	
12	9.6873	0.1282	1.1828	1.0765	30	9.7607	0.0647	1.2661	0.5620	
13	9.6880	0.1298	1.1882	1.0656	31	9.7633	0.0489	1.2647	0.6014	
14	+9.6889	-0.1257	-1.1934	+1.0543	Apr. 1	+9.7663	-0.0388	-1.2631	-0.6374	
15	+9.6902	-0.1173	-1.1984	+1.0425	2	+9.7693	-0.0356	-1.2614	-0.6705	

E = + 0".04

FOR WASHINGTON MEAN MIDNIGHT.									
Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Apr. 1	+9.7663	-0.0388	-1.2631	-0.6374	May 17	+9.8454	-9.1092	-1.0090	-1.2341
2	9.7693	0.0356	1.2614	0.6705	18	9.8462	9.1035	0.9975	1.2355
3	9.7721	0.0389	1.2596	0.7009	19	9.8469	9.0346	0.9856	1.2433
h 4	9.7743	0.0463	1.2577	0.7293	h 20	9.8476	8.8573	0.9733	1.2477
(13.0) 5	9.7760	0.0549	1.2556	0.7559	(16.0) 21	9.8486	-8.2989	0.9606	1.2519
6	+9.7770	-0.0613	-1.2533	-0.7808	22	+9.8502	+8.6222	-0.9473	-1.2559
7	9.7776	0.0630	1.2509	0.8042	23	9.8523	9.0245	0.9334	1.2597
8	9.7779	0.0582	1.2484	0.8262	24	9.8549	9.2127	0.9189	1.2633
9	9.7783	0.0455	1.2458	0.8470	25	9.8579	9.3162	0.9038	1.2668
10	9.7789	0.0266	1.2430	0.8669	26	9.8611	9.3674	0.8881	1.2701
11	+9.7799	-0.0017	-1.2400	-0.8858	27	+9.8642	+9.3804	-0.8716	-1.2733
12	9.7815	9.9741	1.2369	0.9038	28	9.8671	9.3655	0.8544	1.2764
13	9.7838	9.9473	1.2337	0.9208	29	9.8696	9.3310	0.8363	1.2794
14	9.7862	9.9253	1.2303	0.9370	30	9.8715	9.2909	0.8173	1.2822
15	9.7889	9.9114	1.2268	0.9523	31	9.8729	9.2637	0.7974	1.2848
16	+9.7915	-9.9067	-1.2232	-0.9670	June 1	+9.8741	+9.2679	-0.7764	-1.2873
17	9.7937	9.9099	1.2194	0.9812	2	9.8751	9.3108	0.7542	1.2897
18	9.7955	9.9177	1.2154	0.9949	3	9.8762	9.3825	0.7306	1.2920
h 19	9.7967	9.9256	1.2112	1.0081	h 4	9.8775	9.4650	0.7056	1.2941
(14.0) 20	9.7973	9.9296	1.2068	1.0208	(17.0) 5	9.8793	9.5432	0.6790	1.2960
21	+9.7977	-9.9261	-1.2023	-1.0330	6	+9.8815	+9.6081	-0.6505	-1.2978
22	9.7979	9.9133	1.1976	1.0447	7	9.8841	9.6556	0.6199	1.2995
23	9.7983	9.8899	1.1927	1.0560	8	9.8869	9.6846	0.5868	1.3011
24	9.7991	9.8564	1.1877	1.0668	9	9.8898	9.6959	0.5509	1.3026
25	9.8006	9.8148	1.1825	1.0771	10	9.8925	9.6911	0.5116	1.3039
26	+9.8027	-9.7690	-1.1771	-1.0871	11	+9.8948	+9.6735	-0.4682	-1.3051
27	9.8053	9.7249	1.1715	1.0968	12	9.8967	9.6490	0.4199	1.3062
28	9.8083	9.6889	1.1657	1.1062	13	9.8981	9.6240	0.3654	1.3072
29	9.8114	9.6671	1.1597	1.1153	14	9.8991	9.6079	0.3031	1.3081
30	9.8144	9.6607	1.1535	1.1240	15	9.9000	9.6077	0.2300	1.3088
May 1	+9.8170	-9.6671	-1.1471	-1.1325	16	+9.9008	+9.6261	-0.1420	-1.3094
2	9.8191	9.6790	1.1405	1.1407	17	9.9018	9.6599	0.0314	1.3099
3	9.8207	9.6892	1.1337	1.1486	18	9.9032	9.7015	9.8827	1.3103
4	9.8218	9.6904	1.1266	1.1562	h 19	9.9051	9.7427	9.6542	1.3105
h 5	9.8225	9.6774	1.1192	1.1634	(18.0) 20	9.9074	9.7773	-9.1414	1.3106
(15.0) 6	+9.8233	-9.6466	-1.1116	-1.1704	21	+9.9102	+9.8015	+9.2397	-1.3106
7	9.8242	9.5946	1.1037	1.1772	22	9.9131	9.8132	9.6865	1.3105
8	9.8254	9.5198	1.0956	1.1838	23	9.9161	9.8119	9.9019	1.3102
9	9.8272	9.4214	1.0873	1.1903	24	9.9188	9.7990	0.0451	1.3098
10	9.8294	9.3010	1.0787	1.1966	25	9.9212	9.7766	0.1525	1.3093
11	+9.8321	-9.1679	-1.0698	-1.2027	26	+9.9232	+9.7506	+0.2385	-1.3087
12	9.8350	9.0457	1.0605	1.2086	27	9.9247	9.7266	0.3102	1.3080
13	9.8378	8.9713	1.0509	1.2142	28	9.9258	9.7113	0.3714	1.3072
14	9.8404	8.9685	1.0410	1.2194	29	9.9268	9.7096	0.4251	1.3062
15	9.8425	9.0162	1.0307	1.2244	30	9.9278	9.7223	0.4728	1.3051
16	+9.8442	-9.0738	-1.0201	-1.2293	July 1	+9.9290	+9.7468	+0.5157	-1.3039
17	+9.8454	-9.1092	-1.0090	-1.2341	2	+9.9304	+9.7768	+0.5545	-1.3025

E = + 0°.04

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
July 1	+9.9290	+9.7468	+0.5157	-1.3039	Aug. 16	+9.9956	+9.6041	+1.1815	-1.0792
2	9.9304	9.7768	0.5545	1.3025	17	9.9975	9.5770	1.1867	1.0690
3	9.9323	9.8058	0.5900	1.3010	18	9.9992	9.5301	1.1916	1.0584
h 4	9.9345	9.8288	0.6227	1.2994	h 19	0.0006	9.4646	1.1964	1.0474
(19.0) 5	9.9370	9.8421	0.6531	1.2977	(22.0) 20	0.0015	9.3872	1.2011	1.0360
6	+9.9395	+9.8438	+0.6813	-1.2958	21	+0.0022	+9.3098	+1.2056	-1.0241
7	9.9419	9.8337	0.7077	1.2938	22	0.0026	9.2527	1.2099	1.0118
8	9.9441	9.8133	0.7325	1.2917	23	0.0028	9.2353	1.2141	0.9990
9	9.9458	9.7854	0.7558	1.2895	24	0.0032	9.2630	1.2181	0.9857
10	9.9472	9.7545	0.7778	1.2871	25	0.0037	9.3201	1.2219	0.9718
11	+9.9481	+9.7270	+0.7987	-1.2846	26	+0.0045	+9.3849	+1.2256	-0.9573
12	9.9488	9.7096	0.8185	1.2820	27	0.0057	9.4401	1.2291	0.9422
13	9.9494	9.7065	0.8373	1.2792	28	0.0071	9.4768	1.2325	0.9264
14	9.9501	9.7182	0.8552	1.2763	29	0.0086	9.4904	1.2357	0.9098
15	9.9511	9.7405	0.8723	1.2733	30	0.0102	9.4789	1.2388	0.8925
16	+9.9525	+9.7671	+0.8887	-1.2701	31	+0.0117	+9.4407	+1.2418	-0.8743
17	9.9543	9.7912	0.9043	1.2668	Sept. 1	0.0128	9.3766	1.2446	0.8551
18	9.9565	9.8078	0.9193	1.2633	2	0.0137	9.2887	1.2473	0.8349
19	9.9590	9.8138	0.9336	1.2596	h 3	0.0141	9.1867	1.2499	0.8136
h 20	9.9615	9.8073	0.9473	1.2558	(23.0) 4	0.0143	9.0923	1.2523	0.7911
(20.0) 21	+9.9638	+9.7883	+0.9605	-1.2518	5	+0.0143	+9.0425	+1.2546	-0.7671
22	9.9659	9.7576	0.9732	1.2477	6	0.0143	9.0635	1.2567	0.7418
23	9.9676	9.7206	0.9855	1.2434	7	0.0144	9.1420	1.2587	0.7146
24	9.9688	9.6812	0.9974	1.2390	8	0.0148	9.2412	1.2606	0.6854
25	9.9698	9.6473	1.0088	1.2344	9	0.0155	9.3328	1.2623	0.6541
26	+9.9705	+9.6266	+1.0198	-1.2296	10	+0.0167	+9.4024	+1.2639	-0.6201
27	9.9711	9.6247	1.0304	1.2246	11	0.0181	9.4464	1.2654	0.5830
28	9.9718	9.6397	1.0406	1.2195	12	0.0197	9.4625	1.2667	0.5424
29	9.9728	9.6655	1.0504	1.2142	13	0.0214	9.4517	1.2679	0.4974
30	9.9742	9.6937	1.0598	1.2087	14	0.0228	9.4148	1.2690	0.4469
31	+9.9758	+9.7172	+1.0689	-1.2030	15	+0.0240	+9.3553	+1.2700	-0.3899
Aug. 1	9.9777	9.7304	1.0778	1.1971	16	0.0249	9.2806	1.2708	0.3240
2	9.9798	9.7301	1.0865	1.1910	17	0.0254	9.2065	1.2715	0.2460
3	9.9817	9.7144	1.0950	1.1846	18	0.0256	9.1584	1.2721	0.1500
h 4	9.9835	9.6835	1.1032	1.1780	19	0.0257	9.1617	1.2725	0.0276
(21.0) 5	+9.9850	+9.6394	+1.1111	-1.1712	h 20	+0.0259	+9.2178	+1.2728	-9.8553
6	9.9860	9.5863	1.1186	1.1642	21	0.0262	9.3036	1.2730	9.5649
7	9.9867	9.5323	1.1258	1.1570	22	0.0267	9.3938	1.2731	-8.2405
8	9.9871	9.4882	1.1327	1.1495	23	0.0275	9.4719	1.2730	+9.5209
9	9.9873	9.4655	1.1394	1.1417	24	0.0287	9.5308	1.2728	9.8337
10	+9.9876	+9.4697	+1.1459	-1.1337	25	+0.0301	+9.5679	+1.2725	+0.0135
11	9.9881	9.4965	1.1523	1.1254	26	0.0315	9.5832	1.2721	0.1402
12	9.9890	9.5343	1.1585	1.1168	27	0.0328	9.5784	1.2715	0.2381
13	9.9902	9.5715	1.1646	1.1079	28	0.0339	9.5567	1.2708	0.3181
14	9.9917	9.5990	1.1705	1.0987	29	0.0348	9.5231	1.2700	0.3852
15	+9.9936	+9.6110	+1.1761	-1.0891	30	+0.0352	+9.4883	+1.2691	+0.4435
16	+9.9956	+9.6041	+1.1815	-1.0792	Oct. 1	+0.0354	+9.4628	+1.2680	+0.4948

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Oct. 1	+0.0354	+9.4628	+1.2680	+0.4948	Nov. 16	+0.0753	+0.1673	+1.0353	+1.2222
2	0.0354	9.4591	1.2668	0.5404	17	0.0766	0.1862	1.0244	1.2275
3	0.0353	9.4828	1.2655	0.5817	h 18	0.0782	0.2017	1.0130	1.2326
h 4	0.0354	9.5292	1.2640	0.6194	(4.0) 19	0.0799	0.2125	1.0011	1.2375
(1.0) 5	0.0356	9.5882	1.2624	0.6538	20	0.0816	0.2182	0.9887	1.2423
6	+0.0363	+9.6477	+1.2606	+0.6857	21	+0.0832	+0.2192	+0.9758	+1.2469
7	0.0372	9.6996	1.2586	0.7152	22	0.0846	0.2164	0.9624	1.2513
8	0.0385	9.7394	1.2565	0.7427	23	0.0857	0.2129	0.9484	1.2555
9	0.0400	9.7648	1.2543	0.7686	24	0.0865	0.2092	0.9338	1.2596
10	0.0417	9.7763	1.2520	0.7929	25	0.0871	0.2084	0.9186	1.2635
11	+0.0432	+9.7751	+1.2496	+0.8158	26	+0.0875	+0.2118	+0.9028	+1.2672
12	0.0444	9.7650	1.2470	0.8374	27	0.0880	0.2198	0.8863	1.2707
13	0.0454	9.7505	1.2443	0.8579	28	0.0886	0.2320	0.8688	1.2740
14	0.0461	9.7378	1.2414	0.8773	29	0.0895	0.2466	0.8503	1.2772
15	0.0465	9.7334	1.2383	0.8958	30	0.0906	0.2617	0.8309	1.2803
16	+0.0468	+9.7421	+1.2351	+0.9134	Dec. 1	+0.0921	+0.2752	+0.8105	+1.2832
17	0.0470	9.7648	1.2317	0.9301	2	0.0938	0.2856	0.7890	1.2866
18	0.0473	9.7988	1.2282	0.9461	3	0.0957	0.2919	0.7662	1.2886
h 19	0.0479	9.8380	1.2245	0.9615	h 4	0.0976	0.2940	0.7419	1.2910
(2.0) 20	0.0488	9.8770	1.2206	0.9763	(5.0) 5	0.0994	0.2923	0.7160	1.2933
21	+0.0499	+9.9107	+1.2166	+0.9905	6	+0.1009	+0.2881	+0.6885	+1.2954
22	0.0514	9.9367	1.2124	1.0041	7	0.1022	0.2831	0.6588	1.2974
23	0.0529	9.9533	1.2080	1.0172	8	0.1031	0.2792	0.6268	1.2993
24	0.0544	9.9607	1.2034	1.0298	9	0.1039	0.2779	0.5922	1.3010
25	0.0557	9.9605	1.1987	1.0419	10	0.1046	0.2804	0.5543	1.3026
26	+0.0568	+9.9552	+1.1938	+1.0535	11	+0.1053	+0.2870	+0.5128	+1.3040
27	0.0575	9.9484	1.1887	1.0647	12	0.1062	0.2967	0.4666	1.3053
28	0.0580	9.9443	1.1834	1.0755	13	0.1073	0.3081	0.4147	1.3064
29	0.0582	9.9465	1.1779	1.0859	14	0.1086	0.3193	0.3557	1.3074
30	0.0584	9.9571	1.1722	1.0959	15	0.1102	0.3288	0.2872	1.3083
31	+0.0586	+9.9761	+1.1662	+1.1056	16	+0.1119	+0.3352	+0.2056	+1.3090
Nov. 1	0.0590	0.0011	1.1600	1.1149	17	0.1137	0.3379	0.1049	1.3096
2	0.0597	0.0288	1.1536	1.1239	18	0.1154	0.3367	9.9733	1.3100
h 3	0.0608	0.0555	1.1469	1.1326	h 19	0.1169	0.3325	9.7833	1.3103
(3.0) 4	0.0622	0.0782	1.1400	1.1410	(6.0) 20	0.1182	0.3264	+9.4370	1.3105
5	+0.0638	+0.0952	+1.1329	+1.1492	21	+0.1192	+0.3201	-8.7701	+1.3106
6	0.0656	0.1055	1.1256	1.1571	22	0.1199	0.3152	9.5935	1.3105
7	0.0673	0.1095	1.1181	1.1647	23	0.1204	0.3132	9.8603	1.3103
8	0.0689	0.1086	1.1103	1.1720	24	0.1209	0.3149	0.0249	1.3099
9	0.0702	0.1047	1.1021	1.1791	25	0.1215	0.3202	0.1434	1.3094
10	+0.0712	+0.1007	+1.0936	+1.1859	26	+0.1223	+0.3280	-0.2366	+1.3087
11	0.0719	0.0994	1.0848	1.1925	27	0.1233	0.3370	0.3131	1.3079
12	0.0725	0.1031	1.0755	1.1989	28	0.1247	0.3454	0.3780	1.3070
13	0.0730	0.1128	1.0659	1.2051	29	0.1263	0.3517	0.4343	1.3060
14	0.0735	0.1280	1.0560	1.2110	30	0.1280	0.3548	0.4841	1.3048
15	+0.0743	+0.1470	+1.0458	+1.2167	31	+0.1298	+0.3542	-0.5286	+1.3034
16	+0.0753	+0.1673	+1.0353	+1.2222	32	+0.1315	+0.3501	-0.5688	+1.3019

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .	
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
Jan.	$y$	"	"	"	"	"	"			"		
	0	0.0018	+16.23	+1.082	352 10	23 28.7	350 14	23 20.9	+0.8518	+1.3094	-1.50	-0.1756
	1	0.0045	16.33	1.089	352 0	23 28.0	349 18	23 17.2	0.8546	1.3092	1.64	0.2152
	2	0.0072	16.42	1.095	351 56	23 27.7	348 22	23 13.5	0.8568	1.3089	1.78	0.2512
	3	0.0100	16.49	1.099	352 0	23 28.0	347 25	23 9.7	0.8589	1.3086	1.92	0.2842
	4	0.0127	16.58	1.105	352 13	23 28.9	346 28	23 5.9	0.8611	1.3083	2.06	0.3147
	$h$											
	(7.0)											
	5	0.0154	+16.70	+1.113	352 32	23 30.1	345 31	23 2.1	+0.8641	+1.3080	-2.20	-0.3432
	6	0.0181	16.87	1.125	352 52	23 31.4	344 35	22 58.3	0.8680	1.3077	2.34	0.3699
	7	0.0209	17.07	1.138	353 14	23 32.9	343 38	22 54.5	0.8729	1.3074	2.48	0.3948
	8	0.0236	17.31	1.154	353 31	23 34.1	342 41	22 50.7	0.8787	1.3070	2.62	0.4182
	9	0.0264	17.57	1.171	353 39	23 34.6	341 44	22 46.9	0.8850	1.3066	2.76	0.4403
	10	0.0291	+17.83	+1.189	353 39	23 34.6	340 47	22 43.1	+0.8914	+1.3062	-2.89	-0.4611
	11	0.0318	18.07	1.205	353 31	23 34.1	339 50	22 39.3	0.8974	1.3058	3.03	0.4809
	12	0.0346	18.28	1.219	353 18	23 33.2	338 53	22 35.5	0.9027	1.3054	3.17	0.4998
	13	0.0373	18.46	1.231	353 2	23 32.1	337 55	22 31.7	0.9070	1.3049	3.30	0.5177
	14	0.0401	18.59	1.239	352 47	23 31.1	336 57	22 27.8	0.9103	1.3044	3.43	0.5347
	15	0.0428	+18.69	+1.246	352 37	23 30.5	335 59	22 23.9	+0.9128	+1.3039	-3.56	-0.5510
	16	0.0455	18.77	1.251	352 32	23 30.1	335 1	22 20.1	0.9147	1.3034	3.69	0.5666
	17	0.0483	18.84	1.256	352 36	23 30.4	334 3	22 16.2	0.9164	1.3029	3.82	0.5815
	18	0.0510	18.93	1.262	352 46	23 31.1	333 5	22 12.3	0.9184	1.3024	3.95	0.5957
	19	0.0538	19.05	1.270	353 0	23 32.0	332 7	22 8.5	0.9210	1.3019	4.07	0.6093
	$h$											
	(8.0)											
	20	0.0565	+19.21	+1.281	353 16	23 33.1	331 8	22 4.5	+0.9242	+1.3013	-4.19	-0.6223
	21	0.0592	19.39	1.293	353 30	23 34.0	330 10	22 0.7	0.9282	1.3007	4.31	0.6348
	22	0.0620	19.60	1.307	353 39	23 34.6	329 11	21 56.7	0.9328	1.3001	4.43	0.6469
	23	0.0647	19.82	1.321	353 41	23 34.7	328 12	21 52.8	0.9375	1.2995	4.55	0.6586
	24	0.0675	20.04	1.336	353 36	23 34.4	327 13	21 48.9	0.9422	1.2989	4.67	0.6699
	25	0.0702	+20.22	+1.348	353 24	23 33.6	326 14	21 44.9	+0.9464	+1.2983	-4.79	-0.6807
	26	0.0729	20.37	1.358	353 8	23 32.5	325 14	21 40.9	0.9499	1.2977	4.91	0.6911
	27	0.0757	20.49	1.366	352 51	23 31.4	324 15	21 37.0	0.9526	1.2971	5.03	0.7011
	28	0.0784	20.56	1.371	352 37	23 30.5	323 15	21 33.0	0.9545	1.2965	5.14	0.7107
	29	0.0812	20.62	1.375	352 26	23 29.7	322 16	21 29.1	0.9558	1.2959	5.25	0.7200
	30	0.0839	+20.67	+1.378	352 23	23 29.5	321 16	21 25.1	+0.9569	+1.2952	-5.36	-0.7289
	31	0.0866	20.71	1.381	352 26	23 29.7	320 16	21 21.1	0.9579	1.2946	5.47	0.7375
Feb.	1	0.0894	20.80	1.387	352 35	23 30.3	319 16	21 17.1	0.9594	1.2939	5.58	0.7459
	2	0.0921	20.91	1.394	352 49	23 31.3	318 16	21 13.1	0.9616	1.2933	5.68	0.7540
	3	0.0949	21.07	1.405	353 2	23 32.1	317 15	21 9.0	0.9646	1.2926	5.78	0.7618
	$h$											
	(9.0)											
	4	0.0976	+21.26	+1.417	353 13	23 32.9	316 15	21 5.0	+0.9685	+1.2919	-5.88	-0.7693
	5	0.1003	21.48	1.432	353 19	23 33.3	315 14	21 0.9	0.9728	1.2912	5.98	0.7765
	6	0.1031	21.70	1.447	353 18	23 33.2	314 13	20 56.9	0.9773	1.2906	6.08	0.7834
	7	0.1058	21.92	1.461	353 11	23 32.7	313 12	20 52.8	0.9817	1.2899	6.17	0.7901
	8	0.1086	22.11	1.474	352 59	23 31.9	312 11	20 48.7	0.9856	1.2893	6.26	0.7966
	9	0.1113	+22.25	+1.483	352 44	23 30.9	311 9	20 44.6	+0.9887	+1.2886	-6.35	-0.8029
	10	0.1140	22.35	1.490	352 29	23 29.9	310 7	20 40.5	0.9910	1.2879	6.44	0.8089
	11	0.1168	22.43	1.495	352 17	23 29.1	309 5	20 36.3	0.9926	1.2873	6.53	0.8147
	12	0.1195	22.47	1.498	352 10	23 28.7	308 3	20 32.2	0.9936	1.2866	6.61	0.8203
	13	0.1223	22.51	1.501	352 9	23 28.6	307 1	20 28.1	0.9943	1.2860	6.69	0.8257
	14	0.1250	+22.56	+1.504	352 14	23 28.9	305 59	20 23.9	+0.9951	+1.2853	-6.77	-0.8309
	15	0.1277	+22.62	+1.508	352 24	23 29.6	304 57	20 19.8	+0.9962	+1.2847	-6.85	-0.8359



## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .		
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
	$y$	"	s	"	h m	"	h m						
Feb.	15	0.1277	+22.62	+1.508	352 24	23 29.6	304 57	20 19.8	+0.9962	+1.2847	-6.85	-0.8359	
	16	0.1304	22.72	1.515	352 37	23 30.5	303 54	20 15.6	0.9979	1.2841	6.93	0.8407	
	17	0.1332	22.87	1.525	352 49	23 31.3	302 51	20 11.4	1.0004	1.2835	7.00	0.8453	
	h 18	0.1359	23.03	1.535	352 58	23 31.9	301 48	20 7.2	1.0034	1.2829	7.07	0.8497	
	(10.0) 19	0.1386	23.20	1.547	353 2	23 32.1	300 45	20 3.0	1.0067	1.2823	7.14	0.8540	
	20	0.1413	+23.38	+1.559	353 0	23 32.0	299 42	19 58.8	+1.0101	+1.2817	-7.21	-0.8581	
	21	0.1441	23.55	1.570	352 52	23 31.5	298 39	19 54.6	1.0132	1.2811	7.28	0.8620	
	22	0.1468	23.67	1.578	352 40	23 30.7	297 35	19 50.3	1.0157	1.2806	7.34	0.8658	
	23	0.1496	23.76	1.584	352 26	23 29.7	296 31	19 46.1	1.0175	1.2801	7.40	0.8694	
	24	0.1523	23.81	1.587	352 14	23 28.9	295 27	19 41.8	1.0186	1.2796	7.46	0.8728	
	25	0.1550	+23.84	+1.589	352 5	23 28.3	294 23	19 37.5	+1.0193	+1.2791	-7.52	+0.8760	
	26	0.1578	23.84	1.589	352 1	23 28.0	293 19	19 33.3	1.0194	1.2786	7.57	0.8791	
	27	0.1605	23.85	1.590	352 3	23 28.2	292 15	19 29.0	1.0196	1.2781	7.62	0.8820	
	28	0.1633	23.89	1.593	352 11	23 28.7	291 11	19 24.7	1.0201	1.2776	7.67	0.8848	
	Mar.	1	0.1660	23.95	1.597	352 24	23 29.6	290 7	19 20.5	1.0211	1.2772	7.72	0.8875
		2	0.1687	+24.06	+1.604	352 37	23 30.5	289 3	19 16.2	+1.0228	+1.2768	-7.76	-0.8900
		3	0.1715	24.21	1.614	352 51	23 31.4	287 59	19 11.9	1.0253	1.2764	7.80	0.8923
		4	0.1742	24.38	1.625	353 0	23 32.0	286 55	19 7.6	1.0283	1.2760	7.84	0.8945
		h 5	0.1770	24.58	1.639	353 4	23 32.3	285 50	19 3.3	1.0316	1.2756	7.88	0.8965
		(11.0) 6	0.1797	24.76	1.651	353 2	23 32.1	284 45	18 59.0	1.0349	1.2753	7.91	0.8983
		7	0.1824	+24.92	+1.661	352 56	23 31.7	283 41	18 54.7	+1.0378	+1.2750	-7.94	-0.9000
		8	0.1852	25.05	1.670	352 46	23 31.1	282 36	18 50.4	1.0403	1.2747	7.97	0.9016
		9	0.1879	25.15	1.677	352 35	23 30.3	281 31	18 46.1	1.0421	1.2744	8.00	0.9031
		10	0.1907	25.20	1.680	352 27	23 29.8	280 26	18 41.7	1.0431	1.2742	8.03	0.9045
		11	0.1934	25.23	1.682	352 23	23 29.5	279 21	18 37.4	1.0436	1.2740	8.05	0.9058
		12	0.1961	+25.23	+1.682	352 23	23 29.5	278 16	18 33.1	+1.0437	+1.2738	-8.07	-0.9069
		13	0.1989	25.26	1.684	352 31	23 30.1	277 11	18 28.7	1.0439	1.2736	8.09	0.9078
		14	0.2016	25.28	1.685	352 43	23 30.9	276 6	18 24.4	1.0443	1.2735	8.10	0.9086
15		0.2044	25.35	1.690	352 58	23 31.9	275 1	18 20.1	1.0453	1.2734	8.11	0.9092	
16		0.2071	25.46	1.697	353 13	23 32.9	273 56	18 15.7	1.0469	1.2733	8.12	0.9097	
17		0.2098	+25.60	+1.707	353 26	23 33.7	272 51	18 11.4	+1.0490	+1.2733	-8.13	-0.9101	
18		0.2126	25.76	1.717	353 35	23 34.3	271 46	18 7.1	1.0515	1.2732	8.14	0.9104	
19		0.2153	25.92	1.728	353 38	23 34.5	270 41	18 2.7	1.0542	1.2732	8.14	0.9106	
h 20		0.2181	26.07	1.738	353 37	23 34.5	269 36	17 58.4	1.0567	1.2731	8.14	0.9106	
(12.0) 21		0.2208	26.19	1.746	353 31	23 34.1	268 31	17 54.1	1.0588	1.2731	8.14	0.9105	
22		0.2235	+26.27	+1.751	353 24	23 33.6	267 26	17 49.7	+1.0603	+1.2732	-8.13	-0.9103	
23		0.2263	26.32	1.755	353 16	23 33.1	266 21	17 45.4	1.0612	1.2733	8.13	0.9100	
24		0.2290	26.33	1.755	353 11	23 32.7	265 16	17 41.1	1.0615	1.2734	8.12	0.9095	
25		0.2318	26.33	1.755	353 11	23 32.7	264 12	17 36.8	1.0614	1.2735	8.11	0.9088	
26		0.2345	26.32	1.755	353 16	23 33.1	263 8	17 32.5	1.0612	1.2736	8.09	0.9080	
27		0.2372	+26.33	+1.755	353 27	23 33.8	262 3	17 28.2	+1.0613	+1.2738	-8.07	-0.9071	
28		0.2400	26.38	1.759	353 42	23 34.8	260 58	17 23.9	1.0619	1.2740	8.05	0.9061	
29	0.2427	26.47	1.765	353 59	23 35.9	259 54	17 19.6	1.0631	1.2742	8.03	0.9050		
30	0.2455	26.61	1.774	354 16	23 37.1	258 50	17 15.3	1.0651	1.2744	8.01	0.9037		
31	0.2482	26.76	1.784	354 30	23 38.0	257 46	17 11.1	1.0675	1.2747	7.99	0.9023		
Apr.	1	0.2509	+26.95	+1.797	354 40	23 38.7	256 42	17 6.8	+1.0704	+1.2750	-7.96	-0.9008	
	2	0.2537	+27.13	+1.809	354 44	23 38.9	255 38	17 2.5	+1.0733	+1.2753	-7.93	-0.8992	

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	i	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	"	s	°	'	h	m				
Apr. 1	0.2509	+26.95	+1.797	354 40	23 38.7	256 42	17 6.8	+1.0704	+1.2750	-7.96	-0.9008
2	0.2537	27.13	1.809	354 44	23 38.9	255 38	17 2.5	1.0733	1.2753	7.93	0.8992
3	0.2564	27.32	1.821	354 44	23 38.9	254 34	16 58.3	1.0761	1.2756	7.90	0.8974
h 4	0.2592	27.45	1.830	354 40	23 38.7	253 31	16 54.1	1.0784	1.2759	7.86	0.8954
(13.0) 5	0.2619	27.56	1.837	354 35	23 38.3	252 28	16 49.9	1.0801	1.2763	7.82	0.8931
6	0.2646	+27.60	+1.840	354 31	23 38.1	251 25	16 45.7	+1.0812	+1.2767	-7.78	-0.8907
7	0.2673	27.66	1.844	354 30	23 38.0	250 22	16 41.5	1.0818	1.2771	7.74	0.8883
8	0.2701	27.68	1.845	354 34	23 38.3	249 19	16 37.3	1.0821	1.2775	7.69	0.8858
9	0.2728	27.70	1.847	354 44	23 38.9	248 16	16 33.1	1.0823	1.2779	7.64	0.8832
10	0.2755	27.74	1.849	354 58	23 39.9	247 13	16 28.9	1.0828	1.2784	7.59	0.8805
11	0.2782	+27.80	+1.853	355 15	23 41.1	246 10	16 24.7	+1.0836	+1.2788	-7.54	-0.8776
12	0.2810	27.91	1.861	355 33	23 42.2	245 8	16 20.5	1.0850	1.2793	7.49	0.8746
13	0.2837	28.06	1.871	355 51	23 43.4	244 6	16 16.4	1.0871	1.2798	7.44	0.8714
14	0.2865	28.21	1.881	356 3	23 44.2	243 4	16 12.3	1.0894	1.2803	7.38	0.8680
15	0.2892	28.38	1.892	356 13	23 44.9	242 2	16 8.1	1.0920	1.2808	7.32	0.8645
16	0.2919	+28.56	+1.904	356 17	23 45.1	241 0	16 4.0	+1.0946	+1.2813	-7.26	-0.8609
17	0.2947	28.70	1.913	356 16	23 45.1	239 59	15 59.9	1.0968	1.2818	7.20	0.8571
18	0.2974	28.82	1.921	356 13	23 44.9	238 58	15 55.9	1.0986	1.2824	7.13	0.8531
h 19	0.3002	28.90	1.927	356 10	23 44.7	237 57	15 51.8	1.0999	1.2830	7.06	0.8488
(14.0) 20	0.3029	28.94	1.929	356 8	23 44.5	236 56	15 47.7	1.1005	1.2836	6.99	0.8443
21	0.3056	+28.97	+1.931	356 10	23 44.7	235 56	15 43.7	+1.1008	+1.2842	-6.92	-0.8397
22	0.3084	28.98	1.932	356 17	23 45.1	234 56	15 39.7	1.1010	1.2848	6.85	0.8350
23	0.3111	29.00	1.933	356 29	23 45.9	233 55	15 35.7	1.1013	1.2854	6.77	0.8301
24	0.3139	29.06	1.937	356 45	23 47.0	232 55	15 31.7	1.1020	1.2860	6.69	0.8251
25	0.3166	29.16	1.944	357 3	23 48.2	231 55	15 27.7	1.1034	1.2866	6.61	0.8200
26	0.3193	+29.30	+1.953	357 21	23 49.4	230 56	15 23.7	+1.1054	+1.2872	-6.53	-0.8147
27	0.3221	29.47	1.965	357 37	23 50.5	229 56	15 19.7	1.1079	1.2878	6.45	0.8091
28	0.3248	29.68	1.979	357 50	23 51.3	228 57	15 15.8	1.1108	1.2884	6.36	0.8033
29	0.3276	29.89	1.993	357 57	23 51.8	227 58	15 11.9	1.1139	1.2890	6.27	0.7973
30	0.3303	30.10	2.007	358 0	23 52.0	226 59	15 7.9	1.1169	1.2897	6.18	0.7911
May 1	0.3330	+30.28	+2.019	357 59	23 51.9	226 0	15 4.0	+1.1195	+1.2903	-6.09	-0.7847
2	0.3358	30.44	2.029	357 56	23 51.7	225 2	15 0.1	1.1216	1.2910	6.00	0.7781
3	0.3385	30.54	2.036	357 53	23 51.5	224 4	14 56.3	1.1232	1.2916	5.91	0.7712
4	0.3413	30.62	2.041	357 53	23 51.5	223 6	14 52.4	1.1243	1.2923	5.81	0.7641
h 5	0.3440	30.67	2.045	357 57	23 51.8	222 8	14 48.5	1.1250	1.2929	5.71	0.7568
(15.0) 6	0.3467	+30.72	+2.048	358 6	23 52.4	221 10	14 44.7	+1.1257	+1.2936	-5.61	-0.7492
7	0.3495	30.79	2.053	358 19	23 53.3	220 12	14 40.8	1.1266	1.2942	5.51	0.7414
8	0.3522	30.87	2.058	358 35	23 54.3	219 15	14 37.0	1.1278	1.2948	5.41	0.7333
9	0.3550	31.00	2.067	358 53	23 55.5	218 18	14 33.2	1.1295	1.2954	5.31	0.7249
10	0.3577	31.16	2.077	359 9	23 56.6	217 21	14 29.4	1.1317	1.2960	5.20	0.7162
11	0.3604	+31.35	+2.090	359 23	23 57.5	216 24	14 25.6	+1.1343	+1.2966	-5.10	-0.7072
12	0.3632	31.56	2.104	359 32	23 58.1	215 28	14 21.9	1.1372	1.2972	4.99	0.6979
13	0.3659	31.77	2.118	359 37	23 58.5	214 32	14 18.1	1.1400	1.2978	4.88	0.6883
14	0.3687	31.96	2.131	359 37	23 58.5	213 36	14 14.4	1.1426	1.2984	4.77	0.6784
15	0.3714	32.11	2.141	359 34	23 58.3	212 40	14 10.7	1.1447	1.2990	4.66	0.6683
16	0.3741	+32.24	+2.149	359 31	23 58.1	211 44	14 6.9	+1.1464	+1.2996	-4.55	-0.6578
17	0.3769	+32.32	+2.155	359 28	23 57.9	210 48	14 3.2	+1.1476	+1.3002	-4.44	-0.6468

## FOR WASHINGTON MEAN MIDNIGHT.

FOR WASHINGTON MEAN MIDNIGHT.												
Solar Day. (Sid. Hour.)		$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
			In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$				
May	17	0.3769	+32.32	+2.155	359 28	23 57.9	210 48	14 3.2	+1.1476	+1.3002	-4.44	-0.6468
	18	0.3796	32.39	2.159	359 29	23 57.9	209 52	13 59.5	1.1484	1.3007	4.32	0.6353
	19	0.3824	32.44	2.163	359 34	23 58.3	208 56	13 55.8	1.1491	1.3012	4.20	0.6233
	h 20	0.3851	32.49	2.166	359 42	23 58.8	208 1	13 52.1	1.1498	1.3017	4.08	0.6109
	(16.0) 21	0.3878	32.57	2.171	359 55	23 59.7	207 6	13 48.4	1.1508	1.3022	3.96	0.5980
	22	0.3906	+32.68	+2.179	0 10	0 0.7	206 11	13 44.7	+1.1524	+1.3027	-3.84	-0.5846
	23	0.3933	32.84	2.189	0 25	0 1.7	205 17	13 41.1	1.1545	1.3032	3.72	0.5707
	24	0.3961	33.04	2.203	0 39	0 2.6	204 23	13 37.5	1.1571	1.3037	3.60	0.5562
	25	0.3988	33.27	2.218	0 49	0 3.3	203 29	13 33.9	1.1601	1.3042	3.48	0.5412
	26	0.4015	33.52	2.235	0 55	0 3.7	202 35	13 30.3	1.1634	1.3047	3.36	0.5255
	27	0.4042	+33.75	+2.250	0 56	0 3.7	201 41	13 26.7	+1.1665	+1.3051	-3.24	-0.5090
June	28	0.4070	33.98	2.265	0 54	0 3.6	200 47	13 23.1	1.1694	1.3055	3.11	0.4917
	29	0.4097	34.19	2.279	0 50	0 3.3	199 53	13 19.5	1.1719	1.3059	2.98	0.4736
	30	0.4124	34.33	2.289	0 45	0 3.0	198 59	13 15.9	1.1737	1.3063	2.85	0.4548
	31	0.4151	34.44	2.296	0 42	0 2.8	198 5	13 12.3	1.1751	1.3067	2.72	0.4349
	1	0.4179	+34.53	+2.302	0 42	0 2.8	197 11	13 8.7	+1.1763	+1.3071	-2.59	-0.4138
	2	0.4206	34.60	2.307	0 47	0 3.1	196 18	13 5.2	1.1773	1.3074	2.46	0.3915
	3	0.4234	34.69	2.313	0 55	0 3.7	195 24	13 1.6	1.1784	1.3077	2.33	0.3681
	h 4	0.4261	34.80	2.320	1 6	0 4.4	194 31	12 58.1	1.1798	1.3080	2.20	0.3430
	(17.0) 5	0.4288	34.94	2.329	1 19	0 5.3	193 37	12 54.5	1.1816	1.3083	2.07	0.3162
	6	0.4316	+35.13	+2.342	1 31	0 6.1	192 44	12 50.9	+1.1839	+1.3086	-1.94	-0.2877
	7	0.4343	35.34	2.356	1 41	0 6.7	191 51	12 47.4	1.1864	1.3089	1.81	0.2571
July	8	0.4371	35.56	2.371	1 47	0 7.1	190 58	12 43.9	1.1893	1.3091	1.68	0.2239
	9	0.4398	35.80	2.387	1 50	0 7.3	190 5	12 40.3	1.1922	1.3093	1.54	0.1879
	10	0.4425	36.02	2.401	1 48	0 7.2	189 12	12 36.8	1.1949	1.3095	1.41	0.1485
	11	0.4453	+36.21	+2.414	1 43	0 6.9	188 20	12 33.3	+1.1972	+1.3097	-1.27	-0.1053
	12	0.4480	36.38	2.425	1 37	0 6.5	187 27	12 29.8	1.1991	1.3099	1.14	0.0576
	13	0.4508	36.49	2.433	1 31	0 6.1	186 35	12 26.3	1.2005	1.3101	1.00	0.0032
	14	0.4535	36.57	2.438	1 28	0 5.9	185 42	12 22.8	1.2014	1.3102	0.87	9.9403
	15	0.4562	36.64	2.443	1 27	0 5.8	184 49	12 19.3	1.2023	1.3103	0.74	9.8676
	16	0.4590	+36.72	+2.448	1 31	0 6.1	183 57	12 15.8	+1.2032	+1.3104	-0.60	-9.7794
	17	0.4617	36.80	2.453	1 38	0 6.5	183 4	12 12.3	1.2042	1.3105	0.47	9.6691
	18	0.4645	36.92	2.461	1 48	0 7.2	182 12	12 8.8	1.2056	1.3105	0.33	9.5202
h 19	0.4672	37.09	2.473	1 58	0 7.9	181 19	12 5.3	1.2075	1.3106	0.20	9.2941	
(18.0) 20	0.4699	37.28	2.485	2 7	0 8.5	180 26	12 1.8	1.2099	1.3106	-0.06	-8.7796	
21	0.4727	+37.52	+2.501	2 13	0 8.9	179 34	11 58.3	+1.2127	+1.3106	+0.07	+8.8768	
22	0.4754	37.77	2.518	2 16	0 9.1	178 41	11 54.7	1.2156	1.3106	0.20	9.3239	
23	0.4782	38.03	2.535	2 15	0 9.0	177 49	11 51.3	1.2186	1.3105	0.34	9.5394	
24	0.4809	38.27	2.551	2 10	0 8.7	176 56	11 47.7	1.2213	1.3105	0.48	9.6825	
25	0.4836	38.48	2.565	2 3	0 8.2	176 3	11 44.2	1.2237	1.3104	0.61	9.7899	
26	0.4864	+38.66	+2.577	1 55	0 7.7	175 11	11 40.7	+1.2257	+1.3103	+0.75	+9.8757	
27	0.4891	38.80	2.587	1 49	0 7.3	174 18	11 37.2	1.2271	1.3102	0.88	9.9477	
28	0.4919	38.90	2.593	1 45	0 7.0	173 26	11 33.7	1.2282	1.3101	1.02	0.0083	
29	0.4946	38.98	2.599	1 44	0 6.9	172 33	11 30.2	1.2292	1.3099	1.15	0.0622	
30	0.4973	39.07	2.605	1 47	0 7.1	171 40	11 26.7	1.2302	1.3097	1.28	0.1099	
July	1	0.5001	+39.18	+2.612	1 53	0 7.5	170 48	11 23.2	+1.2314	+1.3095	+1.42	+0.1527
	2	0.5028	+39.31	+2.621	2 0	0 8.0	169 55	11 19.7	+1.2329	1.3093	+1.55	+0.1917

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $A$ .	$i$	Log $i$ .	
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
July	$y$	$''$	$s$	$^{\circ}$	$h\ m$	$^{\circ}$	$h\ m$			$''$		
	1	0.5001	+39.18	+2.612	1 53	0 7.5	170 48	11 23.2	+1.2314	+1.3095	+1.42	+0.1527
	2	0.5028	39.31	2.621	2 0	0 8.0	169 55	11 19.7	1.2329	1.3093	1.55	0.1917
	3	0.5056	39.49	2.633	2 8	0 8.5	169 3	11 16.2	1.2348	1.3091	1.69	0.2273
	$h$	0.5083	39.69	2.646	2 14	0 8.9	168 10	11 12.7	1.2370	1.3089	1.82	0.2599
	(19.0)	0.5110	39.91	2.661	2 18	0 9.2	167 17	11 9.1	1.2395	1.3086	1.95	0.2903
	6	0.5138	+40.15	+2.677	2 17	0 9.1	166 24	11 5.6	+1.2420	+1.3083	+2.08	+0.3186
	7	0.5165	40.37	2.691	2 14	0 8.9	165 31	11 2.1	1.2444	1.3080	2.21	0.3451
	8	0.5193	40.57	2.705	2 7	0 8.5	164 38	10 58.5	1.2466	1.3077	2.34	0.3699
	9	0.5220	40.73	2.715	1 58	0 7.9	163 45	10 55.0	1.2483	1.3074	2.47	0.3933
	10	0.5247	40.86	2.724	1 50	0 7.3	162 52	10 51.5	1.2496	1.3071	2.60	0.4154
	11	0.5274	+40.95	+2.730	1 43	0 6.9	161 58	10 47.9	+1.2505	+1.3067	+2.73	+0.4362
	12	0.5302	41.02	2.735	1 39	0 6.6	161 5	10 44.3	1.2512	1.3063	2.86	0.4560
	13	0.5329	41.07	2.738	1 38	0 6.5	160 11	10 40.7	1.2518	1.3059	2.99	0.4748
	14	0.5356	41.13	2.742	1 40	0 6.7	159 17	10 37.1	1.2525	1.3055	3.11	0.4928
	15	0.5383	41.23	2.749	1 45	0 7.0	158 23	10 33.5	1.2536	1.3051	3.24	0.5100
	16	0.5411	+41.36	+2.757	1 52	0 7.5	157 29	10 29.9	+1.2549	+1.3047	+3.36	+0.5264
	17	0.5438	41.54	2.769	1 58	0 7.9	156 35	10 26.3	1.2568	1.3043	3.48	0.5420
	18	0.5466	41.75	2.783	2 2	0 8.1	155 40	10 22.7	1.2590	1.3038	3.60	0.5569
	19	0.5493	41.99	2.799	2 3	0 8.2	154 46	10 19.1	1.2615	1.3033	3.72	0.5710
	$h$	0.5520	42.23	2.815	2 0	0 8.0	153 52	10 15.5	1.2640	1.3028	3.84	0.5846
	(20.0)	0.5548	+42.45	+2.830	1 54	0 7.6	152 58	10 11.9	+1.2662	+1.3023	+3.96	+0.5978
	22	0.5575	42.66	2.844	1 46	0 7.1	152 4	10 8.3	1.2683	1.3018	4.08	0.6106
	23	0.5603	42.83	2.855	1 37	0 6.5	151 9	10 4.6	1.2700	1.3013	4.20	0.6230
	24	0.5630	42.94	2.863	1 28	0 5.9	150 14	10 0.9	1.2712	1.3007	4.31	0.6350
	25	0.5657	43.04	2.869	1 21	0 5.4	149 18	9 57.3	1.2721	1.3002	4.43	0.6465
	26	0.5685	+43.11	+2.874	1 18	0 5.2	148 24	9 53.6	+1.2728	+1.2997	+4.54	+0.6575
	27	0.5712	43.17	2.878	1 17	0 5.1	147 28	9 49.9	1.2734	1.2991	4.65	0.6681
	28	0.5740	43.24	2.883	1 20	0 5.3	146 32	9 46.1	1.2741	1.2985	4.76	0.6783
	29	0.5767	43.34	2.889	1 24	0 5.6	145 36	9 42.4	1.2751	1.2979	4.87	0.6880
	30	0.5794	43.48	2.899	1 30	0 6.0	144 40	9 38.7	1.2766	1.2973	4.98	0.6974
	31	0.5822	+43.64	+2.909	1 34	0 6.3	143 44	9 34.9	+1.2782	+1.2967	+5.09	+0.7065
Aug.	1	0.5849	43.83	2.922	1 37	0 6.5	142 48	9 31.2	1.2801	1.2961	5.20	0.7154
	2	0.5877	44.04	2.936	1 36	0 6.4	141 52	9 27.5	1.2822	1.2955	5.30	0.7241
	3	0.5904	44.24	2.949	1 33	0 6.2	140 55	9 23.7	1.2841	1.2949	5.40	0.7325
	$h$	0.5931	44.42	2.961	1 26	0 5.7	139 58	9 19.9	1.2858	1.2943	5.50	0.7406
	(21.0)	0.5959	+44.57	+2.971	1 17	0 5.1	139 1	9 16.1	+1.2873	+1.2937	+5.60	+0.7484
	6	0.5986	44.68	2.979	1 8	0 4.5	138 4	9 12.3	1.2883	1.2931	5.70	0.7559
	7	0.6014	44.75	2.983	1 0	0 4.0	137 7	9 8.5	1.2890	1.2925	5.80	0.7632
	8	0.6041	44.79	2.986	0 54	0 3.6	136 9	9 4.6	1.2894	1.2918	5.89	0.7702
	9	0.6068	44.81	2.987	0 53	0 3.5	135 11	9 0.7	1.2896	1.2912	5.98	0.7770
	10	0.6096	+44.84	+2.989	0 53	0 3.5	134 13	8 56.9	+1.2899	+1.2906	+6.07	+0.7836
	11	0.6123	44.89	2.993	0 55	0 3.7	133 15	8 53.0	1.2904	1.2899	6.16	0.7900
	12	0.6151	44.98	2.999	1 0	0 4.0	132 17	8 49.1	1.2914	1.2893	6.25	0.7962
	13	0.6178	45.11	3.007	1 5	0 4.3	131 19	8 45.2	1.2925	1.2887	6.34	0.8021
	14	0.6205	45.27	3.018	1 9	0 4.6	130 20	8 41.3	1.2940	1.2881	6.42	0.8078
	15	0.6233	+45.46	+3.031	1 11	0 4.7	129 21	8 37.4	+1.2959	+1.2874	+6.50	+0.8133
	16	0.6260	+45.67	+3.045	1 10	0 4.7	128 22	8 33.5	+1.2979	+1.2868	+6.58	+0.8187

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)		$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
			In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Aug.   <												

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .		
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
Oct.	1	0.7520	+50.04	+3.336	0 46	0 3.1	80 28	5 21.9	+1.3376	+1.2741	+8.04	+0.9056	
	2	0.7547	50.04	3.336	0 45	0 3.0	79 24	5 17.6	1.3376	1.2743	8.02	0.9043	
	3	0.7574	50.03	3.335	0 48	0 3.2	78 20	5 13.3	1.3375	1.2745	7.99	0.9029	
	h (1.0)	4	0.7602	50.04	3.336	0 53	0 3.5	77 16	5 9.1	1.3376	1.2748	7.96	0.9014
	5	0.7629	50.08	3.339	1 1	0 4.1	76 12	5 4.8	1.3379	1.2751	7.93	0.8997	
	6	0.7657	+50.15	+3.343	1 10	0 4.7	75 8	5 0.5	+1.3386	+1.2754	+7.90	+0.8979	
	7	0.7684	50.25	3.350	1 19	0 5.3	74 4	4 56.3	1.3395	1.2757	7.87	0.8960	
	8	0.7711	50.40	3.360	1 26	0 5.7	73 0	4 52.0	1.3408	1.2761	7.83	0.8940	
	9	0.7739	50.59	3.373	1 31	0 6.1	71 56	4 47.7	1.3424	1.2765	7.79	0.8919	
	10	0.7766	50.77	3.385	1 33	0 6.2	70 52	4 43.5	1.3440	1.2769	7.75	0.8896	
	11	0.7794	+50.95	+3.397	1 32	0 6.1	69 48	4 39.2	+1.3455	+1.2773	+7.71	+0.8872	
	12	0.7821	51.10	3.407	1 30	0 6.0	68 45	4 35.0	1.3467	1.2777	7.66	0.8846	
	13	0.7848	51.21	3.414	1 27	0 5.8	67 41	4 30.7	1.3477	1.2781	7.61	0.8819	
	14	0.7875	51.29	3.419	1 24	0 5.6	66 38	4 26.5	1.3484	1.2786	7.56	0.8790	
	15	0.7903	51.34	3.423	1 23	0 5.5	65 35	4 22.3	1.3488	1.2791	7.51	0.8759	
	16	0.7930	+51.38	+3.425	1 25	0 5.7	64 32	4 18.1	+1.3491	+1.2796	+7.46	+0.8727	
	17	0.7957	51.40	3.427	1 30	0 6.0	63 29	4 13.9	1.3494	1.2801	7.40	0.8693	
	18	0.7984	51.43	3.429	1 37	0 6.5	62 26	4 9.7	1.3497	1.2806	7.34	0.8658	
	h (2.0)	19	0.8012	51.50	3.433	1 46	0 7.1	61 23	4 5.5	1.3503	1.2812	7.28	0.8621
	20	0.8039	51.61	3.441	1 55	0 7.7	60 21	4 1.4	1.3512	1.2817	7.22	0.8582	
	21	0.8067	+51.74	+3.449	2 4	0 8.3	59 18	3 57.2	+1.3524	+1.2823	+7.15	+0.8541	
	22	0.8094	51.92	3.461	2 12	0 8.8	58 16	3 53.1	1.3539	1.2829	7.08	0.8499	
	23	0.8121	52.10	3.473	2 16	0 9.1	57 14	3 48.9	1.3554	1.2835	7.01	0.8455	
	24	0.8149	52.28	3.485	2 17	0 9.1	56 12	3 44.8	1.3569	1.2841	6.94	0.8409	
	25	0.8176	52.44	3.496	2 16	0 9.1	55 10	3 40.7	1.3582	1.2847	6.86	0.8362	
	26	0.8204	+52.57	+3.505	2 15	0 9.0	54 8	3 36.5	+1.3593	+1.2853	+6.78	+0.8313	
	27	0.8231	52.65	3.510	2 13	0 8.9	53 6	3 32.4	1.3600	1.2859	6.70	0.8262	
	28	0.8258	52.69	3.513	2 12	0 8.8	52 4	3 28.3	1.3605	1.2865	6.62	0.8209	
	29	0.8286	52.74	3.516	2 13	0 8.9	51 2	3 24.1	1.3607	1.2871	6.54	0.8154	
	30	0.8313	52.76	3.517	2 16	0 9.1	50 1	3 20.1	1.3609	1.2877	6.45	0.8097	
	31	0.8341	+52.78	+3.519	2 22	0 9.5	49 0	3 16.0	+1.3612	+1.2884	+6.36	+0.8037	
Nov.	1	0.8368	52.83	3.522	2 30	0 10.0	47 59	3 11.9	1.3616	1.2891	6.27	0.7975	
	2	0.8395	52.92	3.528	2 39	0 10.6	46 59	3 7.9	1.3624	1.2898	6.18	0.7911	
	h (3.0)	3	0.8423	53.06	3.537	2 49	0 11.3	45 58	3 3.9	1.3635	1.2904	6.09	0.7845
	4	0.8450	53.23	3.549	2 58	0 11.9	44 58	2 59.9	1.3650	1.2911	5.99	0.7776	
	5	0.8478	+53.42	+3.561	3 4	0 12.3	43 57	2 55.8	+1.3666	+1.2918	+5.89	+0.7705	
	6	0.8505	53.64	3.576	3 7	0 12.5	42 57	2 51.8	1.3684	1.2924	5.79	0.7631	
	7	0.8532	53.86	3.591	3 9	0 12.6	41 57	2 47.8	1.3701	1.2931	5.69	0.7554	
	8	0.8560	54.05	3.603	3 8	0 12.5	40 57	2 43.8	1.3717	1.2937	5.59	0.7474	
	9	0.8587	54.21	3.614	3 5	0 12.3	39 58	2 39.9	1.3730	1.2944	5.48	0.7392	
	10	0.8615	+54.34	+3.623	3 3	0 12.2	38 58	2 35.9	+1.3740	+1.2950	+5.37	+0.7307	
	11	0.8642	54.43	3.629	3 2	0 12.1	37 58	2 31.9	1.3747	1.2957	5.27	0.7219	
	12	0.8669	54.50	3.633	3 4	0 12.3	36 59	2 27.9	1.3753	1.2963	5.16	0.7128	
	13	0.8697	54.56	3.637	3 8	0 12.5	36 0	2 24.0	1.3758	1.2970	5.05	0.7034	
	14	0.8724	54.63	3.642	3 14	0 12.9	35 1	2 20.1	1.3764	1.2976	4.94	0.6936	
	15	0.8752	+54.73	+3.649	3 23	0 13.5	34 2	2 16.1	+1.3773	+1.2982	+4.83	+0.6834	
	16	0.8779	+54.86	+3.657	3 32	0 14.1	33 3	2 12.2	+1.3783	+1.2988	+4.71	+0.6728	

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	$y$	$+54.86$	$+3.657$	$3\ 32$	$0\ 14.1$	$33\ 3$	$2\ 12.2$	$+1.3783$	$+1.2988$	$+4.71$	$+0.6728$
Nov. 16	0.8779										
17	0.8806	55.02	3.668	3 40	0 14.7	32 4	2 8.3	1.3797	1.2994	4.59	0.6617
h 18	0.8834	55.22	3.681	3 47	0 15.1	31 5	2 4.3	1.3814	1.3000	4.47	0.6502
(4.0) 19	0.8861	55.44	3.696	3 52	0 15.4	30 7	2 0.5	1.3831	1.3006	4.35	0.6383
20	0.8889	55.66	3.711	3 54	0 15.6	29 9	1 56.6	1.3848	1.3012	4.23	0.6260
21	0.8916	$+55.86$	$+3.724$	3 54	0 15.6	28 11	1 52.7	$+1.3864$	$+1.3017$	$+4.11$	$+0.6133$
22	0.8943	56.04	3.736	3 52	0 15.4	27 13	1 48.9	1.3878	1.3022	3.99	0.6001
23	0.8971	56.18	3.745	3 49	0 15.3	26 15	1 45.0	1.3889	1.3027	3.86	0.5862
24	0.8998	56.28	3.752	3 47	0 15.1	25 17	1 41.1	1.3897	1.3032	3.73	0.5716
25	0.9026	56.36	3.757	3 46	0 15.1	24 20	1 37.3	1.3902	1.3037	3.60	0.5563
26	0.9053	$+56.41$	$+3.761$	3 48	0 15.2	23 23	1 33.5	$+1.3907$	$+1.3042$	$+3.47$	$+0.5403$
27	0.9080	56.48	3.765	3 52	0 15.5	22 25	1 29.7	1.3912	1.3047	3.34	0.5237
28	0.9108	56.56	3.771	3 58	0 15.9	21 28	1 25.9	1.3918	1.3052	3.20	0.5062
29	0.9135	56.67	3.778	4 6	0 16.4	20 31	1 22.1	1.3928	1.3057	3.07	0.4878
30	0.9163	56.82	3.788	4 14	0 16.9	19 34	1 18.3	1.3940	1.3061	2.93	0.4684
Dec. 1	0.9190	$+57.02$	$+3.801$	4 21	0 17.4	18 37	1 14.5	$+1.3956$	$+1.3065$	$+2.80$	$+0.4480$
2	0.9217	57.24	3.816	4 27	0 17.8	17 40	1 10.7	1.3973	1.3069	2.66	0.4265
3	0.9244	57.49	3.833	4 29	0 17.9	16 43	1 6.9	1.3992	1.3073	2.53	0.4037
h 4	0.9272	57.75	3.850	4 29	0 17.9	15 46	1 3.1	1.4011	1.3076	2.39	0.3794
(5.0) 5	0.9299	57.98	3.865	4 27	0 17.8	14 49	0 59.3	1.4029	1.3079	2.26	0.3534
6	0.9326	$+58.19$	$+3.879$	4 24	0 17.6	13 53	0 55.5	$+1.4044$	$+1.3082$	$+2.12$	$+0.3258$
7	0.9353	58.35	3.890	4 20	0 17.3	12 56	0 51.7	1.4056	1.3085	1.98	0.2962
8	0.9381	58.48	3.899	4 17	0 17.1	11 59	0 47.9	1.4065	1.3088	1.84	0.2641
9	0.9408	58.59	3.906	4 15	0 17.0	11 3	0 44.2	1.4073	1.3091	1.70	0.2294
10	0.9436	58.68	3.912	4 16	0 17.1	10 7	0 40.5	1.4080	1.3094	1.56	0.1916
11	0.9463	$+58.78$	$+3.919$	4 20	0 17.3	9 11	0 36.7	$+1.4087$	$+1.3096$	$+1.41$	$+0.1498$
12	0.9490	58.89	3.926	4 25	0 17.7	8 14	0 32.9	1.4097	1.3098	1.27	0.1036
13	0.9518	59.05	3.937	4 32	0 18.1	7 18	0 29.2	1.4109	1.3100	1.13	0.0519
14	0.9545	59.23	3.949	4 38	0 18.5	6 22	0 25.5	1.4122	1.3101	0.99	0.9930
15	0.9573	59.44	3.963	4 43	0 18.9	5 26	0 21.7	1.4139	1.3102	0.85	+9.9247
16	0.9600	$+59.68$	$+3.979$	4 46	0 19.1	4 30	0 18.0	$+1.4156$	$+1.3103$	$+0.70$	$+9.8432$
17	0.9627	59.92	3.995	4 47	0 19.1	3 34	0 14.3	1.4174	1.3104	0.55	9.7483
18	0.9655	60.16	4.011	4 45	0 19.0	2 38	0 10.5	1.4191	1.3105	0.41	9.6109
h 19	0.9682	60.37	4.025	4 41	0 18.7	1 42	0 6.8	1.4206	1.3105	0.26	9.4211
(6.0) 20	0.9710	60.54	4.036	4 36	0 18.4	0 46	0 3.1	1.4218	1.3106	+0.12	+9.0759
21	0.9737	$+60.68$	$+4.045$	4 32	0 18.1	359 50	23 59.3	$+1.4228$	$+1.3106$	$-0.03$	$-8.4082$
22	0.9764	60.76	4.051	4 28	0 17.9	358 54	23 55.6	1.4234	1.3106	0.17	9.2316
23	0.9792	60.85	4.057	4 27	0 17.8	357 58	23 51.9	1.4239	1.3105	0.32	9.4983
24	0.9819	60.92	4.061	4 27	0 17.8	357 2	23 48.1	1.4244	1.3105	0.46	9.6624
25	0.9847	61.00	4.067	4 30	0 18.0	356 6	23 44.4	1.4250	1.3104	0.61	9.7810
26	0.9874	$+61.12$	$+4.075$	4 35	0 18.3	355 9	23 40.6	$+1.4259$	$+1.3103$	$-0.75$	$-9.8739$
27	0.9901	61.27	4.085	4 40	0 18.7	354 13	23 36.9	1.4269	1.3102	0.89	9.9504
28	0.9929	61.46	4.097	4 44	0 18.9	353 17	23 33.1	1.4284	1.3101	1.04	0.0153
29	0.9956	61.69	4.113	4 47	0 19.1	352 21	23 29.4	1.4300	1.3099	1.18	0.0713
30	0.9984	61.93	4.129	4 48	0 19.2	351 25	23 25.7	1.4317	1.3097	1.33	0.1211
31	1.0011	$+62.18$	$+4.145$	4 47	0 19.1	350 28	23 21.9	$+1.4335$	$+1.3095$	$-1.47$	$-0.1657$
32	1.0038	$+62.43$	$+4.162$	4 43	0 18.9	349 32	23 18.1	$+1.4352$	$+1.3093$	$-1.60$	$-0.2060$

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ' "	"
<i>a</i> Andromedæ . . .	2.1	0 3 9.946	+ 3.0932	+ 28 31 58.03	+19.883
* <i>β</i> Cassiopeiæ . . .	2.4	0 3 47.187	3.1792	+ 58 35 32.47	19.850
* 22 Andromedæ . . .	4.9	0 5 4.215	3.1055	+ 45 30 36.00	20.034
4 Draconis (H.) . S. P.	5.1	0 7 28.708	2.8741	+101 49 21.21	20.020
<i>γ</i> Pegasi ( <i>Algenib.</i> ) . .	2.8	0 8 2.046	3.0847	+ 14 37 19.25	20.021
* <i>σ</i> Andromedæ . . .	4.4	0 13 3.037	+ 3.1253	+ 36 13 30.77	+19.980
* <i>ι</i> Ceti . . .	3.6	0 14 16.702	3.0526	- 9 23 2.91	19.954
* 6 Ursæ Minoris . S. P.	6.2	0 14 22.244	0.2510	+ 91 44 24.02	19.939
* 44 Piscium . . .	5.8	0 20 13.469	3.0735	+ 1 22 49.24	19.950
<i>β</i> Hydri . . .	2.8	0 20 26.558	3.2169	- 77 49 23.26	20.279
12 Ceti . . .	6.0	0 24 53.039	+ 3.0611	- 4 30 55.05	+19.932
<i>κ</i> Draconis . . . S. P.	3.8	0 29 10.527	2.5868	+109 39 18.54	19.884
* <i>π</i> Andromedæ . . .	4.4	0 31 29.063	3.1929	+ 33 9 47.96	19.865
<i>a</i> Cassiopeiæ ( <i>var.</i> ) . .	2.3	0 34 46.440	3.3791	+ 55 59 0.09	19.781
<i>β</i> Ceti . . .	2.2	0 38 31.218	3.0137	- 18 32 27.93	19.794
21 Cassiopeiæ . . .	5.7	0 38 58.013	+ 3.8732	+ 74 26 9.79	+19.742
* <i>ο</i> Cassiopeiæ . . .	4.7	0 39 5.636	3.3231	+ 47 43 53.49	19.746
* <i>δ</i> Piscium . . .	4.8	0 43 26.459	3.1081	+ 7 2 7.45	19.645
32 <sup>2</sup> Camelop. (H.) . S. P.	5.2	0 48 23.090	0.4130	+ 96 2 17.59	19.594
* <i>γ</i> Cassiopeiæ . . .	2.3	0 50 36.523	3.5858	+ 60 10 10.98	19.552
* <i>μ</i> Andromedæ . . .	4.0	0 51 8.670	+ 3.3140	+ 37 57 6.00	+19.606
* 43 Cephei (H.) . . .	4.6	0 54 53.940	7.3666	+ 85 42 55.44	19.480
<i>ε</i> Piscium . . .	4.3	0 57 42.024	3.1099	+ 7 20 46.92	19.443
<i>β</i> Andromedæ . . .	2.2	1 4 4.537	3.3471	+ 35 5 6.14	19.151
* <i>κ</i> Tucanæ . . .	4.9	1 12 20.899	2.0534	- 69 24 44.66	19.161
* <i>f</i> Piscium . . .	5.1	1 12 35.272	+ 3.0904	+ 3 4 57.37	+19.025
<i>θ</i> <sup>1</sup> Ceti . . .	3.6	1 18 58.463	2.9972	- 8 42 16.21	18.654
<i>a</i> Ursæ Minoris ( <i>Polaris</i> )	2.2	1 22 8.629	25.0288	+ 88 46 7.89	18.778
38 Cassiopeiæ . . .	5.9	1 23 42.394	4.3917	+ 69 44 41.26	18.654
* <i>κ</i> Octantis . . . S. P.	5.4	1 24 35.030	8.8908	- 94 43 53.86	18.705
<i>η</i> Piscium . . .	3.7	1 26 4.654	+ 3.2039	+ 14 49 30.69	+18.647
* <i>υ</i> Andromedæ . . .	4.2	1 30 52.081	3.5078	+ 40 54 1.79	18.127
* <i>π</i> Piscium . . .	5.5	1 31 44.613	3.1753	+ 11 37 30.33	18.515
<i>a</i> Eridani ( <i>Achernar</i> ) . .	0.4	1 33 56.780	2.2311	- 57 44 59.67	18.343
* <i>ν</i> Piscium . . .	4.6	1 36 10.472	3.1187	+ 4 58 35.48	18.311
<i>ο</i> Piscium . . .	4.4	1 40 3.561	+ 3.1633	+ 8 38 57.13	+18.197
* <i>ζ</i> Ceti . . .	3.6	1 46 28.504	2.9620	- 10 50 6.62	17.803
<i>β</i> Arietis . . .	2.8	1 49 3.529	3.3053	+ 20 18 51.55	17.707
50 Cassiopeiæ . . .	4.1	1 54 48.028	5.0292	+ 71 55 57.56	17.612
* <i>γ</i> Andromedæ . . .	2.2	1 57 41.809	3.6641	+ 41 50 42.27	17.418
<i>a</i> Arietis . . .	2.1	2 1 28.696	+ 3.3729	+ 22 59 5.48	+17.149
<i>a</i> Draconis . . . S. P.	3.7	2 1 39.346	1.6242	+115 8 29.92	17.287
* <i>β</i> Trianguli . . .	3.1	2 3 31.935	3.5575	+ 34 30 34.57	17.179
<i>ξ</i> <sup>1</sup> Ceti . . .	4.5	2 7 38.759	+ 3.1752	+ 8 22 22.42	17.007
* 4 Ursæ Minoris . S. P.	4.9	2 9 14.188	- 0.3079	+101 58 40.10	16.903
* <i>γ</i> Trianguli . . .	4.3	2 11 18.478	+ 3.5537	+ 33 22 48.67	+16.818
* 67 Ceti . . .	5.6	2 11 56.676	2.9898	- 6 53 15.68	16.710
* <i>δ</i> Hydri . . .	4.2	2 19 57.121	1.0575	- 96 7 7.94	16.441
<i>ι</i> Cassiopeiæ . . .	4.6	2 20 43.970	4.8747	+ 66 56 53.91	16.393
<i>ξ</i> <sup>2</sup> Ceti . . .	4.5	2 22 47.298	+ 3.1849	+ 8 0 26.26	+16.269

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.



MEAN PLACES FOR 1899.0. (January 0 <sup>d</sup> .0—0 <sup>d</sup> .140, Washington.)						
Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.	
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	
5 Ursæ Minoris . S. P.	4.5	2 27 44.141	- 0.1789	+103 51 18.26	+16.012	
* μ Hydri . . . .	5.3	2 33 47.741	- 1.4104	- 79 32 59.06	15.693	
* δ Ceti . . . .	4.1	2 34 18.327	+ 3.0736	- 0 6 26.50	15.670	
* θ Persei . . . .	4.2	2 37 17.920	4.0747	+ 48 48 4.38	15.422	
γ Ceti . . . .	3.6	2 38 3.960	3.1042	+ 2 48 36.48	15.311	
* α Arietis . . . .	5.5	2 45 54.907	+ 3.3059	+ 14 39 56.92	+14.983	
β Ursæ Minoris . S. P.	2.2	2 50 59.793	- 0.2213	+105 25 54.43	14.721	
* 47 Cephei (H.) . .	5.7	2 52 38.533	+ 7.7654	+ 79 1 10.11	14.624	
* ε Arietis . . . .	4.6	2 53 26.127	3.4228	+ 20 56 11.44	14.578	
α Ceti . . . .	2.6	2 56 59.917	3.1313	+ 3 41 36.48	14.278	
* β Persei (Algol) (var.) .	2.3	3 1 35.662	+ 3.8870	+ 40 33 59.22	+14.082	
48 Cephei (H.) . .	5.5	3 7 29.522	7.4408	+ 77 21 49.20	13.655	
ζ Arietis . . . .	4.8	3 9 5.676	3.4410	+ 20 40 12.44	13.521	
α Persei . . . .	1.9	3 17 6.600	+ 4.2622	+ 49 30 5.96	13.048	
* ι Hydri . . . .	5.7	3 18 28.373	- 1.5796	- 77 45 26.11	13.042	
* ρ Octantis . . S. P.	5.7	3 19 58.308	+13.1107	- 95 52 16.68	+12.850	
γ <sup>3</sup> Ursæ Minoris . S. P.	3.2	3 20 53.242	- 0.1265	+107 48 23.84	12.812	
* f Tauri . . . .	4.3	3 25 17.716	+ 3.3062	+ 12 35 26.35	12.533	
ε Eridani . . . .	3.7	3 28 10.275	2.8241	- 9 47 59.60	12.363	
δ Persei . . . .	3.1	3 35 43.919	4.2539	+ 47 27 52.23	11.762	
* γ Camelopardalis (H.) .	4.6	3 39 41.339	+ 6.2537	+ 71 1 15.58	+11.474	
η Tauri . . . .	3.1	3 41 28.730	+ 3.5586	+ 23 47 33.88	11.340	
ζ Ursæ Minoris . S. P.	4.6	3 47 39.770	- 2.2322	+101 53 41.19	10.947	
ζ Persei . . . .	3.0	3 47 46.906	+ 3.7623	+ 31 35 0.64	10.906	
γ Hydri . . . .	3.3	3 48 47.834	- 0.9863	- 74 32 54.36	10.993	
* ε Persei . . . .	3.0	3 51 4.394	+ 4.0127	+ 39 43 4.83	+ 10.676	
γ Eridani . . . .	3.0	3 53 19.059	2.7990	- 13 47 45.09	10.413	
* A <sup>1</sup> Tauri . . . .	4.6	3 58 43.402	3.5414	+ 21 48 20.44	10.042	
* ε Persei . . . .	4.3	4 1 19.620	4.3406	+ 47 26 33.97	9.888	
Groombr. 2320 . S. P.	5.5	4 6 2.459	0.1436	+111 55 25.34	9.496	
* α <sup>1</sup> Eridani . . . .	4.2	4 6 56.095	+ 2.9274	- 7 6 3.62	+ 9.581	
γ Tauri . . . .	3.8	4 14 2.695	+ 3.4101	+ 15 23 1.51	8.916	
* η Ursæ Minoris . S. P.	5.0	4 20 27.177	- 1.8055	+104 0 42.59	8.185	
η Draconis . . S. P.	2.8	4 22 37.520	+ 0.8081	+118 15 26.27	8.211	
ε Tauri . . . .	3.6	4 22 43.071	+ 3.4986	+ 18 57 22.92	8.214	
* δ Mensæ . . . .	5.6	4 24 48.040	- 4.1973	- 80 27 4.60	+ 8.098	
* m Persei . . . .	6.0	4 26 18.450	+ 4.2123	+ 42 50 52.61	7.952	
A Draconis . . S. P.	5.0	4 28 10.979	- 0.1311	+111 0 48.86	7.800	
α Tauri (Aldebaran) .	1.0	4 30 7.455	+ 3.4384	+ 16 18 22.45	7.472	
* τ Tauri . . . .	4.5	4 36 10.921	3.5965	+ 22 45 47.16	7.145	
α Camelopardalis . .	4.4	4 44 0.172	+ 5.9315	+ 66 10 15.73	+ 6.527	
* ι Tauri . . . .	5.2	4 45 27.899	3.5063	+ 18 40 4.19	6.361	
ι Aurigæ . . . .	2.8	4 50 24.928	3.9020	+ 33 0 22.22	5.974	
* ζ Aurigæ . . . .	3.9	4 55 25.016	+ 4.1867	+ 40 55 42.43	5.570	
ε Ursæ Minoris . S. P.	4.5	4 56 18.768	- 6.3017	+ 97 47 47.04	5.503	
11 Orionis . . . .	4.7	4 58 47.801	+ 3.4251	+ 15 15 48.16	+ 5.252	
* β Eridani . . . .	2.9	5 2 53.053	2.9489	- 5 13 0.90	4.887	
α Aurigæ (Capella) . .	0.1	5 9 13.620	4.4262	+ 45 53 42.69	3.971	
β Orionis (Rigel) . .	0.3	5 9 41.011	2.8817	- 8 19 6.11	4.361	
* τ Orionis . . . .	3.8	5 12 42.122	+ 2.9131	- 6 57 13.38	+ 4.098	

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
$\beta$ Tauri . . . . .	1.8	5 19 54.402	+ 3.7900	+ 28 31 19.49	+3.310
* $\chi$ Aurigæ . . . . .	5.0	5 26 9.326	3.9057	+ 32 7 3.68	2.970
Groombridge 966 . . . . .	6.4	5 26 13.595	8.0076	+ 74 58 36.85	2.963
$\delta$ Orionis ( <i>var.</i> ) . . . . .	2.3	5 26 50.781	3.0637	- 0 22 26.18	2.886
$\alpha$ Leporis . . . . .	2.7	5 28 16.522	2.6450	- 17 53 40.57	2.766
* Groombridge 944 . . . . .	6.4	5 29 36.492	+18.7104	+ 85 8 47.61	+2.665
$\epsilon$ Orionis . . . . .	1.8	5 31 5.276	3.0427	- 1 15 59.11	2.524
$\alpha$ Columbæ . . . . .	2.7	5 35 59.568	+ 2.1730	- 34 7 41.07	2.052
$\epsilon$ Draconis . . . S. P.	4.9	5 37 32.623	- 0.3528	+111 11 43.42	1.638
* $\kappa$ Orionis . . . . .	2.3	5 42 57.945	+ 2.8451	- 9 42 19.86	1.492
$\phi^1$ Draconis . . . S. P.	4.8	5 43 43.975	- 1.0772	+107 48 5.99	+1.695
* $\nu$ Aurigæ . . . . .	4.1	5 44 29.310	+ 4.1548	+ 39 7 8.25	1.392
* $\delta$ Doradus . . . . .	4.4	5 44 35.701	0.1055	- 65 46 24.26	1.326
$\alpha$ Orionis ( <i>var.</i> ) . . . . .	0.9	5 49 42.209	3.2473	+ 7 23 17.49	0.908
* $\beta$ Aurigæ . . . . .	2.0	5 52 7.228	4.4021	+ 44 56 13.35	0.679
* $\theta$ Aurigæ . . . . .	2.9	5 52 50.085	+ 4.0923	+ 37 12 19.73	+0.538
$\nu$ Orionis . . . . .	4.5	6 1 48.391	+ 3.4275	+ 14 46 49.65	-0.188
$\delta$ Ursæ Minoris . . . S. P.	4.4	6 4 52.353	-19.4850	+ 93 23 12.79	0.478
22 Camelopardalis (H.) . . . . .	4.7	6 7 42.756	+ 6.6165	+ 69 21 18.83	0.793
* $\eta$ Geminorum . . . . .	3.5	6 8 46.905	3.6229	+ 22 32 9.89	0.785
$\mu$ Geminorum . . . . .	3.2	6 16 51.057	+ 3.6314	+ 22 33 55.16	-1.594
* $\phi^1$ Aurigæ . . . . .	5.1	6 17 7.253	4.6260	+ 49 20 21.80	1.508
$\alpha$ Argûs ( <i>Canopus</i> ) . . . . .	-0.8	6 21 42.661	+ 1.3305	- 52 38 25.59	1.888
* $\chi$ Draconis . . . S. P.	3.8	6 22 52.615	- 1.0804	+107 18 39.86	1.624
* $\nu$ Geminorum . . . . .	4.2	6 22 57.957	+ 3.5629	+ 20 16 33.59	2.028
$\gamma$ Geminorum . . . . .	2.0	6 31 52.647	+ 3.4671	+ 16 29 7.66	-2.828
* $\epsilon$ Geminorum . . . . .	3.2	6 37 43.086	3.6930	+ 25 13 52.09	3.299
* $\phi^5$ Aurigæ . . . . .	5.4	6 39 27.533	4.3281	+ 43 40 40.40	3.288
† $\alpha$ Canis Majoris ( <i>Sirius</i> ) . . . . .	-1.4	6 40 41.850	2.6436	- 16 34 39.31	4.749
* $\theta$ Geminorum . . . . .	3.7	6 46 8.013	+ 3.9598	+ 34 4 59.41	4.041
* $\zeta$ Mensæ . . . . .	5.6	6 48 27.370	- 4.9172	- 80 42 26.86	-4.127
50 Draconis . . . S. P.	5.6	6 49 37.860	- 1.9133	+104 41 6.35	4.383
51 Cephei (H.) . . . . .	5.3	6 53 13.301	+29.6635	+ 87 12 24.91	4.652
$\epsilon$ Canis Majoris . . . . .	1.5	6 54 39.409	2.3579	- 28 50 5.17	4.749
* $\zeta$ Geminorum ( <i>var.</i> ) . . . . .	4.0	6 58 7.182	3.5619	+ 20 43 5.96	5.049
$\delta$ Canis Majoris . . . . .	1.9	7 4 17.063	+ 2.4386	- 26 13 57.83	-5.541
* 63 Aurigæ . . . . .	5.2	7 4 42.586	+ 4.1352	+ 39 29 7.75	5.568
* $\gamma^2$ Volantis ( <i>var.</i> ) . . . . .	3.9	7 9 36.131	- 0.4967	- 70 20 7.88	5.997
* 25 Camelopardalis . . . . .	5.3	7 9 51.057	+12.9116	+ 82 36 22.72	6.051
$\delta$ Draconis . . . S. P.	3.1	7 12 31.994	0.0273	+112 30 58.12	6.327
$\delta$ Geminorum . . . . .	3.5	7 14 5.508	+ 3.5872	+ 22 10 5.74	-6.386
$\tau$ Draconis . . . S. P.	4.5	7 17 29.941	- 1.1226	+106 49 55.24	6.760
Piazzi vii, 67 . . . . .	5.7	7 20 22.638	+ 6.2905	+ 68 40 19.34	6.927
* $\beta$ Canis Minoris . . . . .	3.1	7 21 40.490	+ 3.2593	+ 8 29 33.96	7.033
$\lambda$ Ursæ Minoris . . . S. P.	6.5	7 23 38.409	-67.5578	+ 91 0 51.30	7.165
$\alpha^3$ Geminorum ( <i>Castor</i> ) . . . . .	1.9	7 28 9.472	+ 3.8371	+ 32 6 36.94	-7.601
† $\alpha$ Canis Min. ( <i>Procyon</i> ) . . . . .	0.5	7 34 0.910	3.1429	+ 5 29 1.63	9.033
$\beta$ Geminorum ( <i>Pollux</i> ) . . . . .	1.2	7 39 8.204	3.6779	+ 28 16 12.48	8.462
$\varphi$ Geminorum . . . . .	5.0	7 47 19.037	3.6787	+ 27 1 38.31	9.074
* 26 Lyncis . . . . .	5.8	7 47 21.578	+ 4.3851	+ 47 49 34.55	-9.074

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

† Periodic corrections given in the Appendix are still to be applied to the positions of Sirius and Procyon.

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
* Groombridge 1374	5.6	7 48 6.485	+7.2684	+ 74 11 15.83	- 9.146
* ε Draconis . . . S. P.	3.9	7 48 30.822	-0.1834	+109 59 21.44	9.171
* ω <sup>1</sup> Cancri	6.0	7 54 49.280	+3.6361	+ 25 40 9.95	9.627
3 Ursæ Majoris (H.)	5.5	8 2 46.218	6.0375	+ 68 46 16.78	10.233
15 Argûs (ρ)	3.1	8 3 14.560	2.5545	- 24 0 47.21	10.225
* ζ <sup>1</sup> Cancri . . .	4.8	8 6 25.211	+3.4454	+ 17 57 6.52	-10.644
* β Cancri . . .	3.8	8 11 2.304	+3.2578	+ 9 29 48.19	10.894
* κ Cephei (pr.) . . S. P.	4.4	8 12 17.574	-1.9390	+102 35 33.57	10.971
* 30 Monocerotis . .	3.9	8 20 36.821	+2.9997	- 3 34 36.45	11.540
* θ Chamæleontis . .	4.6	8 23 40.151	-1.7260	- 77 9 31.24	11.740
η Cancri	5.4	8 26 52.193	+3.4771	+ 20 47 3.25	-12.042
Groombr. 3241 . . S. P.	6.5	8 30 26.651	-0.2263	+107 48 37.68	12.218
* σ Hydræ . . .	4.5	8 33 28.897	+3.1453	+ 3 41 45.54	12.468
* γ Cancri . . .	4.9	8 37 26.549	3.4791	+ 21 49 54.04	12.760
* ε Hydræ . . .	3.5	8 41 25.702	3.1811	+ 6 47 21.67	13.038
* δ <sup>2</sup> Cancri (mean)	5.5	8 48 5.032	+3.6714	+ 30 57 42.86	-13.445
12 Year Cat. 1879. S. P.	5.3	8 52 10.566	-2.5792	+ 99 49 35.14	13.657
ι Ursæ Majoris . .	3.3	8 52 17.646	+4.1291	+ 48 26 17.41	13.946
δ <sup>2</sup> Ursæ Majoris . .	5.0	9 1 30.645	5.3421	+ 67 32 41.03	14.328
* κ Cancri . . .	5.1	9 2 16.689	3.2549	+ 11 4 29.11	14.322
* θ Hydræ . . .	4.0	9 9 6.642	+3.1256	+ 2 44 25.11	-15.047
* β Argûs . . .	2.0	9 12 5.496	0.6744	- 69 18 4.11	14.811
ι Argûs . . .	2.6	9 14 22.984	1.6009	- 58 51 3.64	15.012
* α Lyncis . . .	3.3	9 14 54.160	3.6666	+ 34 49 10.07	15.060
* α Cephei . . . S. P.	2.6	9 16 10.183	1.4359	+117 50 32.92	15.186
α Hydræ . . .	2.1	9 22 37.466	+2.9490	- 8 13 14.99	-15.477
ι Draconis (H.) . .	4.5	9 22 42.403	8.9246	+ 81 46 22.49	15.530
δ Ursæ Majoris . .	4.8	9 25 33.255	5.3848	+ 70 16 27.04	15.608
θ Ursæ Majoris . .	3.2	9 26 6.142	4.0359	+ 52 8 15.20	16.253
β Cephei (pr.) . . S. P.	3.4	9 27 21.436	0.7908	+109 52 58.09	15.763
* 10 Leonis Minoris .	4.7	9 28 2.305	+3.6914	+ 36 50 45.84	-15.815
* ο Leonis . . .	3.8	9 35 45.641	+3.2061	+ 10 21 6.47	16.248
* ζ Chamæleontis . .	5.2	9 36 52.182	-1.5901	- 80 29 15.50	16.273
* ε Leonis . . .	3.2	9 40 7.159	+3.4134	+ 24 14 21.33	16.453
11 Cephei . . . S. P.	4.8	9 40 26.729	0.8982	+109 9 13.07	16.546
μ Leonis . . .	4.0	9 47 1.230	+3.4202	+ 26 28 57.64	-16.822
* 19 Leonis Minoris .	5.2	9 51 30.046	3.6919	+ 41 32 12.07	16.989
79 Draconis . . . S. P.	6.6	9 51 36.178	0.7247	+106 46 31.80	17.018
* π Leonis . . .	5.0	9 54 52.594	3.1735	+ 8 31 43.68	17.160
α Leonis (Regulus)	1.3	10 2 59.629	3.1996	+ 12 27 38.99	17.496
32 Ursæ Majoris . .	5.7	10 10 42.181	+4.4099	+ 65 36 43.27	-17.840
* λ Ursæ Majoris . .	3.6	10 11 0.420	3.6359	+ 43 25 6.20	17.895
γ <sup>1</sup> Leonis . . .	2.5	10 14 24.297	3.1334	+ 20 21 8.89	18.107
* μ Hydræ . . .	4.1	10 21 12.379	2.9011	- 16 19 15.87	18.327
* β Leonis Minoris .	4.3	10 22 2.686	3.4838	+ 37 13 29.46	18.335
* α Antliæ . . .	4.5	10 22 31.733	+2.7400	- 30 33 13.84	-18.233
9 Draconis (H.) . .	5.0	10 26 31.505	5.2366	+ 76 13 59.42	18.424
ρ Leonis . . .	4.0	10 27 29.658	3.1634	+ 9 49 34.58	18.449
226 Cephei (B.) . . S. P.	5.7	10 30 30.217	1.0742	+104 17 38.86	18.534
* β Octantis . . . S. P.	4.4	10 35 44.551	+6.4225	- 98 5 20.96	-18.715

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ' "	"
* 41 Leonis Minoris . . .	5.1	10 37 55.513	+3.2692	+ 23 43 1.97	-18.754
η Argūs ( <i>var.</i> ) . . .	1-6	10 41 8.421	2.3156	- 59 9 12.59	18.881
l Leonis . . .	5.3	10 43 56.967	3.1578	+ 11 4 46.60	18.987
* δ <sup>2</sup> Chamæleontis . . .	4.7	10 44 50.586	0.6289	- 80 0 27.86	18.984
ε Cephei . . . S. P.	3.6	10 46 4.908	2.1240	+114 19 51.42	18.886
* 46 Leonis Minoris . . .	3.9	10 47 39.874	+3.3671	+ 34 45 34.76	-19.310
* Groombridge 1706 . . .	6.3	10 51 52.927	4.9395	+ 78 18 40.73	19.202
α Ursæ Majoris . . .	2.0	10 57 29.831	+3.7398	+ 62 17 46.65	19.377
* η Octantis . . .	6.1	11 0 2.867	-0.2434	- 84 3 2.14	19.370
* β <sup>3</sup> Leonis . . .	6.2	11 1 44.997	+3.0595	+ 2 30 13.61	19.494
* φ Ursæ Majoris . . .	3.2	11 3 59.196	+3.3899	+ 45 2 46.02	-19.516
δ Leonis . . .	2.7	11 8 44.279	3.1970	+ 21 4 37.19	19.695
* γ Ursæ Majoris . . .	3.7	11 13 1.662	3.2555	+ 33 38 43.88	19.582
δ Crateris . . .	3.9	11 14 17.464	2.9969	- 14 13 55.81	19.472
ο Cephei . . . S. P.	5.1	11 14 28.681	2.4479	+112 26 27.72	19.676
τ Leonis . . .	5.1	11 22 44.588	+3.0859	+ 3 24 44.72	-19.809
λ Draconis . . .	4.0	11 25 24.540	3.6109	+ 69 53 18.56	19.845
* ξ Hydræ . . .	3.8	11 28 1.976	2.9445	- 31 17 55.95	19.891
υ Leonis . . .	4.4	11 31 46.644	3.0713	- 0 15 58.36	19.866
γ Cephei . . . S. P.	3.5	11 35 11.737	2.4225	+102 55 53.34	20.078
* χ Ursæ Majoris . . .	3.9	11 40 43.175	+3.1871	+ 48 20 21.58	-19.965
β Leonis . . .	2.2	11 43 54.504	3.0633	+ 15 8 11.76	20.122
γ Ursæ Majoris . . .	2.4	11 48 31.280	3.1777	+ 54 15 22.21	20.029
Groombr. 4163 . . . S. P.	6.6	11 49 55.037	2.8738	+106 9 6.42	20.024
* π Virginis . . .	4.6	11 55 41.800	3.0739	+ 7 10 38.31	20.087
ο Virginis . . .	4.3	12 0 3.856	+3.0573	+ 9 17 38.00	-20.014
* ε Corvi . . .	3.2	12 4 55.786	3.0843	- 22 3 29.01	20.048
4 Draconis (H.) . . .	5.1	12 7 28.708	2.8741	+ 78 10 38.79	20.020
γ Corvi . . .	2.7	12 10 36.688	3.0807	- 16 58 52.35	20.015
* 2 Canum Venaticorum . . .	6.0	12 11 4.012	3.0198	+ 41 13 20.88	20.062
β Chamæleontis . . .	4.5	12 12 24.963	+3.4176	- 78 45 4.40	-20.000
* 6 Ursæ Minoris . . .	6.2	12 14 22.244	0.2510	+ 88 15 35.98	19.939
η Virginis . . .	4.0	12 14 44.319	3.0689	- 0 6 20.28	20.038
α <sup>1</sup> Crucis . . .	0.9	12 20 58.710	3.3017	- 62 32 21.78	20.008
* δ <sup>2</sup> Corvi . . .	3.1	12 24 38.418	3.1037	- 15 57 10.75	20.080
* β Canum Venaticorum . . .	4.4	12 28 56.844	+2.8577	+ 41 54 22.18	-19.610
β Corvi . . .	2.8	12 29 4.830	3.1432	- 22 50 17.90	19.957
κ Draconis . . .	3.8	12 29 10.527	2.5868	+ 70 20 41.46	19.884
* γ Virginis ( <i>mean</i> ) . . .	2.9	12 36 32.558	3.0387	- 0 53 44.67	19.805
21 Cassiopeiæ . . . S. P.	5.7	12 38 58.013	3.8732	+105 33 50.21	19.742
* 31 Comæ Berenices . . .	5.1	12 46 46.892	+2.9293	+ 28 5 24.37	-19.652
32 <sup>2</sup> Camelopardalis (H.) . . .	5.2	12 48 23.090	0.4130	+ 83 57 42.41	19.594
* γ Cassiopeiæ . . . S. P.	2.3	12 50 36.523	3.5858	+119 49 49.02	19.552
α Canum Venaticorum . . .	3.2	12 51 18.293	2.8140	+ 38 51 49.35	19.504
* 43 Cephei (H.) . . . S. P.	4.6	12 54 53.940	7.3666	+ 94 17 4.56	19.480
* δ Muscæ . . .	3.8	12 55 20.797	+4.2376	- 71 0 13.34	-19.462
* ε Virginis . . .	3.1	12 57 8.994	2.9879	+ 11 30 6.92	19.406
θ Virginis . . .	4.6	13 4 43.163	3.1019	- 4 59 59.66	19.300
* 20 Canum Venaticorum . . .	4.7	13 13 0.864	2.6956	+ 41 6 15.23	19.024
α Virginis ( <i>Spica</i> ) . . .	1.1	13 19 52.255	+3.1548	- 10 38 3.39	-18.885

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MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
<i>a</i> Urs. Min. ( <i>Polaris</i> ) S. P.	2.2	13 22 8.629	+25.0288	+ 91 13 52.11	-18.778
38 Cassiopeiæ . S. P.	5.9	13 23 42.394	4.3917	+110 15 18.74	18.654
* <i>κ</i> Octantis . . .	5.4	13 24 35.030	8.8908	- 85 16 6.14	18.705
<i>ζ</i> Virginis . . .	3.6	13 29 32.756	3.0537	- 0 4 46.50	18.501
* B. A. C. 4536 . . .	5.0	13 30 17.205	2.6814	+ 37 41 59.02	18.525
* <i>m</i> Virginis . . .	5.4	13 36 18.611	+ 3.1443	- 8 11 36.06	-18.267
<i>η</i> Ursæ Majoris . . .	1.9	13 43 33.748	2.3703	+ 49 49 1.81	18.064
<i>η</i> Bootis . . .	2.8	13 49 52.548	2.8567	+ 18 54 14.19	18.152
50 Cassiopeiæ . S. P.	4.1	13 54 48.028	5.0292	+108 4 2.44	17.612
* <i>θ</i> Apodis ( <i>var.</i> ) . . .	5.0	13 55 29.042	5.7027	- 76 18 31.65	17.554
<i>β</i> Centauri . . .	0.7	13 56 41.290	+ 4.1857	- 59 53 9.49	-17.562
* <i>π</i> Hydrae . . .	3.6	14 0 37.027	3.4031	- 26 11 41.54	17.340
<i>α</i> Draconis . . .	3.7	14 1 39.346	1.6242	+ 64 51 30.08	17.287
* <i>d</i> Bootis . . .	4.8	14 5 47.621	2.7385	+ 25 34 11.79	17.180
* <i>κ</i> Virginis . . .	4.2	14 7 30.437	+ 3.1950	- 9 48 13.53	16.901
* 4 Ursæ Minoris . . .	4.9	14 9 14.188	- 0.3079	+ 78 1 19.90	-16.903
* <i>δ</i> Octantis . . .	5.0	14 10 42.601	+ 9.0739	- 83 12 18.33	16.889
<i>α</i> Bootis ( <i>Arcturus</i> ) . . .	0.2	14 11 3.270	2.7352	+ 19 42 29.24	18.863
* <i>λ</i> Bootis . . .	4.3	14 12 32.651	2.2822	+ 46 33 6.96	16.643
* <i>λ</i> Virginis . . .	4.7	14 13 38.614	3.2393	- 12 54 22.88	16.722
<i>ι</i> Cassiopeiæ . S. P.	4.6	14 20 43.970	+ 4.8747	+113 3 6.09	-16.393
<i>θ</i> Bootis . . .	4.1	14 21 45.582	2.0441	+ 52 19 2.73	16.745
<i>ρ</i> Bootis . . .	3.6	14 27 28.713	+ 2.5876	+ 30 48 52.43	15.939
5 Ursæ Minoris . . .	4.5	14 27 44.141	- 0.1789	+ 76 8 41.74	16.012
<i>α</i> Centauri ( <i>mean</i> ) . . .	-0.1	14 32 44.213	+ 4.0414	- 60 25 6.77	15.024
* <i>μ</i> Hydri . . S. P.	5.3	14 33 47.741	- 1.4104	-100 27 0.94	-15.693
* 33 Bootis . . .	5.3	14 35 4.716	+ 2.2341	+ 44 50 24.12	15.691
* <i>α</i> Apodis . . .	4.1	14 35 18.619	7.2349	- 78 36 58.15	15.623
<i>ε</i> Bootis . . .	2.6	14 40 34.635	2.6214	+ 27 29 59.48	15.318
<i>α</i> <sup>3</sup> Libræ . . .	2.9	14 45 17.356	+ 3.3110	- 15 37 19.91	15.138
<i>β</i> Ursæ Minoris . . .	2.2	14 50 59.793	- 0.2213	+ 74 34 5.57	-14.721
* 47 Cephei (H.) . S. P.	5.7	14 52 38.533	+ 7.7654	+100 58 49.89	14.624
<i>β</i> Bootis . . .	3.7	14 58 8.518	2.2601	+ 40 47 19.45	14.339
* <i>γ</i> Scorpïi . . .	3.4	14 58 9.414	3.5014	- 24 53 6.36	14.345
48 Cephei (H.) . S. P.	5.5	15 7 29.522	7.4408	+102 38 10.80	13.655
* <i>δ</i> Bootis . . .	3.5	15 11 25.915	+ 2.4210	+ 33 41 30.07	-13.559
<i>β</i> Libræ . . .	2.9	15 11 34.255	3.2229	- 9 0 37.44	13.477
* <i>ρ</i> Octantis . . .	5.7	15 19 58.308	13.1107	- 84 7 43.32	12.850
<i>μ</i> <sup>1</sup> Bootis . . .	4.5	15 20 40.514	+ 2.2664	+ 37 43 52.84	12.756
<i>γ</i> <sup>3</sup> Ursæ Minoris . . .	3.2	15 20 53.242	- 0.1265	+ 72 11 36.16	12.812
* <i>β</i> Coronæ Borealis . . .	3.9	15 23 39.934	+ 2.4753	+ 29 27 12.90	-12.568
<i>α</i> Coronæ Borealis . . .	2.3	15 30 24.710	2.5395	+ 27 3 16.02	12.278
<i>α</i> Serpentis . . .	2.7	15 39 17.554	2.9523	+ 6 44 35.42	11.518
* <i>γ</i> Camelop. (H.) . S. P.	4.6	15 39 41.339	6.2537	+108 58 44.42	11.474
<i>ε</i> Serpentis . . .	3.7	15 45 46.856	+ 2.9877	+ 4 46 54.20	11.015
<i>ζ</i> Ursæ Minoris . . .	4.6	15 47 39.770	- 2.2322	+ 78 6 18.81	-10.947
<i>ε</i> Coronæ Borealis . . .	4.1	15 53 24.426	+ 2.4835	+ 27 10 12.86	10.583
<i>δ</i> Scorpïi . . .	2.6	15 54 21.619	3.5402	- 22 20 3.60	10.487
<i>β</i> <sup>1</sup> Scorpïi . . .	2.9	15 59 33.805	3.4821	- 19 31 44.98	10.098
* <i>δ</i> <sup>1</sup> Apodis . . .	4.9	16 5 14.857	+ 8.8068	- 78 26 27.74	- 9.627

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MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
* φ Herculis . . . . .	4.2	16	5	34.967	+ 1.8818	+ 45	11	58.63	- 9.558
Groombridge 2320 . . . . .	5.5	16	6	2.459	0.1436	+ 68	4	34.66	9.496
δ Ophiuchi . . . . .	2.8	16	9	3.123	3.1404	- 3	26	3.58	9.476
* σ Coronæ Borealis ( <i>mean</i> ) . . . . .	5.3	16	10	53.696	2.2450	+ 34	6	52.96	9.230
τ Herculis . . . . .	3.9	16	16	42.300	1.8015	+ 46	33	13.00	8.713
* γ Apodis . . . . .	4.0	16	17	57.937	+ 9.0949	- 78	40	13.38	-8.637
* η Ursæ Minoris . . . . .	5.0	16	20	27.177	- 1.8055	+ 75	59	17.41	8.185
η Draconis . . . . .	2.8	16	22	37.520	+ 0.8081	+ 61	44	33.73	8.211
α Scorpii ( <i>Antares</i> ) . . . . .	1.2	16	23	12.805	3.6716	- 26	12	28.73	8.256
β Herculis . . . . .	2.8	16	25	52.675	+ 2.5778	+ 21	42	34.63	8.024
A Draconis . . . . .	5.0	16	28	10.979	- 0.1311	+ 68	59	11.14	-7.800
ζ Ophiuchi . . . . .	2.8	16	31	35.798	+ 3.2999	- 10	21	45.40	7.523
α Trianguli Australis . . . . .	2.2	16	37	58.150	6.3122	- 68	50	31.69	7.076
η Heruclis . . . . .	3.7	16	39	25.950	2.0542	+ 39	6	51.20	6.995
α Camelopardalis . S. P. . . . .	4.4	16	44	0.172	5.9315	+113	49	44.27	6.527
κ Ophiuchi . . . . .	3.4	16	52	53.244	+ 2.8379	+ 9	31	55.24	-5.795
ε Ursæ Minoris . . . . .	4.5	16	56	18.768	- 6.3017	+ 82	12	12.96	5.503
d Herculis . . . . .	5.3	16	57	51.587	+ 2.2116	+ 33	42	52.04	5.368
* η Ophiuchi . . . . .	2.5	17	4	35.064	3.4362	- 15	36	0.08	4.723
α <sup>1</sup> Herculis ( <i>var.</i> ) . . . . .	3.2	17	10	2.508	2.7339	+ 14	30	19.20	4.309
* π Herculis . . . . .	3.4	17	11	31.776	+ 2.0894	+ 36	55	22.35	-4.201
* θ Ophiuchi . . . . .	3.3	17	15	48.340	3.6801	- 24	53	56.28	3.896
δ Ophiuchi ( <i>var.</i> ) . . . . .	4.4	17	20	12.076	3.6597	- 24	4	56.87	3.596
* δ Aræ . . . . .	3.8	17	21	58.920	5.4042	- 60	35	59.79	3.452
Groombridge 966 S. P. . . . .	6.4	17	26	13.595	8.0076	+105	1	23.15	2.963
β Draconis . . . . .	3.0	17	28	9.053	+ 1.3539	+ 52	22	33.33	-2.778
* Groombridge 944 S. P. . . . .	6.4	17	29	36.492	18.7104	+ 94	51	12.39	2.665
α Ophiuchi . . . . .	2.2	17	30	14.746	2.7832	+ 12	38	0.28	2.833
* ι Herculis . . . . .	4.0	17	36	36.971	+ 1.6970	+ 46	3	35.69	2.043
α Draconis . . . . .	4.9	17	37	32.623	- 0.3528	+ 68	48	16.58	1.638
μ Herculis . . . . .	3.5	17	42	30.358	+ 2.3467	+ 27	46	46.26	-2.289
φ <sup>1</sup> Draconis . . . . .	4.8	17	43	43.975	- 1.0772	+ 72	11	54.01	1.695
* θ Herculis . . . . .	3.9	17	52	47.307	+ 2.0554	+ 37	15	49.82	0.612
γ Draconis . . . . .	2.5	17	54	15.639	1.3918	+ 51	30	2.09	0.532
γ <sup>3</sup> Sagittarii . . . . .	2.9	17	59	19.151	3.8517	- 30	25	31.83	-0.278
* σ Herculis . . . . .	3.9	18	3	36.162	+ 2.3396	+ 28	44	54.30	+0.318
δ Ursæ Minoris . . . . .	4.4	18	4	52.353	-19.4850	+ 86	36	47.21	0.478
22 Camelop. (H.) . S. P. . . . .	4.7	18	7	42.756	+ 6.6165	+110	38	41.17	0.793
μ <sup>1</sup> Sagittarii . . . . .	4.1	18	7	43.377	3.5867	- 21	5	7.18	0.663
η Serpentis . . . . .	3.5	18	16	4.997	3.1025	- 2	55	29.25	0.731
* λ Sagittarii . . . . .	2.9	18	21	44.241	+ 3.7025	- 25	28	40.37	+1.676
* χ Draconis . . . . .	3.8	18	22	52.615	- 1.0804	+ 72	41	20.14	1.624
ι Aquilæ . . . . .	4.0	18	29	42.653	+ 3.2645	- 8	18	53.67	2.263
* ζ Pavonis . . . . .	4.2	18	31	13.925	7.0254	- 71	30	50.55	2.584
α Lyræ ( <i>Vega</i> ) . . . . .	0.2	18	33	31.148	2.0314	+ 38	41	22.00	3.195
β Lyræ ( <i>var.</i> ) . . . . .	3.6	18	46	21.066	+ 2.2144	+ 33	14	42.55	+4.010
σ Sagittarii . . . . .	2.3	18	49	0.162	+ 3.7211	- 26	25	20.29	4.178
50 Draconis . . . . .	5.6	18	49	37.860	- 1.9133	+ 75	18	53.65	4.383
51 Cephei (H.) . S. P. . . . .	5.3	18	53	13.301	+29.6635	+ 92	47	35.09	4.652
* γ Lyræ . . . . .	3.3	18	55	9.945	+ 2.2445	+ 32	33	3.45	+4.791

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MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
σ Octantis . . . . .	5.6	18	58	3.613	+102.9178	- 89	15	22.06	+ 5.009
ζ Aquilæ . . . . .	3.1	19	0	46.077	2.7569	+ 13	42	47.53	5.151
* γ Lyræ . . . . .	5.2	19	3	41.897	2.1413	+ 35	56	30.44	5.511
* 25 Camelopardalis . S. P.	5.3	19	9	51.057	12.9116	+ 97	23	37.28	6.051
δ Sagittarii . . . . .	5.0	19	11	43.534	3.5117	- 19	7	57.75	6.155
δ Draconis . . . . .	3.1	19	12	31.994	+ 0.0273	+ 67	29	1.88	+ 6.327
* θ Lyræ . . . . .	4.4	19	12	51.661	+ 2.0791	+ 37	57	13.03	6.269
τ Draconis . . . . .	4.5	19	17	29.941	- 1.1226	+ 73	10	4.76	6.760
Piazzi vii, 67 . . . S. P.	5.7	19	20	22.638	+ 6.2905	+111	19	40.66	6.927
δ Aquilæ . . . . .	3.5	19	20	24.355	3.0251	+ 2	54	47.85	6.969
λ Ursæ Minoris . . . . .	6.5	19	23	38.409	-67.5578	+ 88	59	8.70	+ 7.165
* β Cygni . . . . .	3.1	19	26	38.898	+ 2.4195	+ 27	44	50.60	7.394
κ Aquilæ . . . . .	5.0	19	31	27.462	3.2284	- 7	15	7.31	7.791
* β Sagittæ . . . . .	4.5	19	36	30.775	2.6955	+ 17	14	30.47	8.168
γ Aquilæ . . . . .	2.8	19	41	27.480	2.8521	+ 10	22	1.18	8.581
* δ Cygni . . . . .	2.9	19	41	49.134	+ 1.8761	+ 44	53	2.52	+ 8.655
α Aquilæ ( <i>Altair</i> ) . . . . .	0.9	19	45	51.335	2.9274	+ 8	36	5.02	9.307
* Groombridge 1374 S. P.	5.6	19	48	6.485	+ 7.2684	+105	48	44.17	9.146
ε Draconis . . . . .	3.9	19	48	30.822	- 0.1834	+ 70	0	38.56	9.171
* ε Pavonis . . . . .	4.1	19	48	54.381	+ 7.0038	- 73	10	33.98	9.175
β Aquilæ . . . . .	3.9	19	50	21.125	+ 2.9469	+ 6	9	15.46	+ 8.795
* γ Sagittæ . . . . .	3.6	19	54	15.933	2.6678	+ 19	13	4.18	9.627
* ε Sagittarii . . . . .	4.5	19	56	26.926	3.6955	- 27	59	26.10	9.772
τ Aquilæ . . . . .	5.7	19	59	12.427	2.9329	+ 6	59	33.88	9.973
3 Ursæ Majoris (H.) S. P.	5.5	20	2	46.218	6.0375	+111	13	43.22	10.233
* θ Aquilæ . . . . .	3.3	20	6	5.594	+ 3.0968	- 1	7	16.42	+10.493
* 31 Cygni . . . . .	3.9	20	10	27.090	+ 1.8894	+ 46	26	5.53	10.810
κ Cephei ( <i>pr.</i> ) . . . . .	4.4	20	12	17.574	- 1.9390	+ 77	24	26.43	10.971
α <sup>2</sup> Capricorni . . . . .	3.7	20	12	27.068	+ 3.3313	- 12	51	28.69	10.954
α Pavonis . . . . .	2.1	20	17	40.010	4.7784	- 57	3	30.95	11.243
γ Cygni . . . . .	2.3	20	18	36.321	+ 2.1539	+ 39	55	59.54	+11.394
π Capricorni . . . . .	5.1	20	21	32.462	3.4385	- 18	32	34.56	11.594
ε Delphini . . . . .	4.0	20	28	23.296	+ 2.8671	+ 10	57	35.96	12.073
Groombridge 3241 . . . . .	6.5	20	30	26.651	- 0.2263	+ 72	11	22.32	12.218
* α Delphini . . . . .	3.9	20	34	56.816	+ 2.7878	+ 15	33	20.18	12.551
* β Pavonis . . . . .	3.4	20	35	51.666	+ 5.4630	- 66	33	57.65	+12.588
α Cygni . . . . .	1.4	20	37	59.339	2.0446	+ 44	55	9.21	12.745
* φ Capricorni . . . . .	4.3	20	40	6.985	3.5592	- 25	38	2.12	12.735
* ε Cygni . . . . .	2.6	20	42	7.489	2.4281	+ 33	35	30.23	13.366
μ Aquarii . . . . .	4.8	20	47	12.409	+ 3.2390	- 9	21	44.90	13.322
12 Year Catalogue, 1879 . . . . .	5.3	20	52	10.566	- 2.5792	+ 80	10	24.86	+13.657
ν Cygni . . . . .	4.1	20	53	24.443	+ 2.2345	+ 40	46	41.46	13.747
σ <sup>3</sup> Ursæ Majoris . . . S. P.	5.0	21	1	30.645	5.3421	+112	27	18.97	14.328
61 <sup>1</sup> Cygni . . . . .	5.4	21	2	22.113	2.6836	+ 38	15	9.05	17.560
ζ Cygni . . . . .	3.3	21	8	38.194	2.5500	+ 29	48	44.77	14.636
* τ Cygni . . . . .	3.8	21	10	45.572	+ 2.3939	+ 37	36	51.22	+15.285
α Cephei . . . . .	2.6	21	16	10.183	1.4359	+ 62	9	27.08	15.186
ι Pegasi . . . . .	4.3	21	17	24.883	2.7724	+ 19	22	19.98	15.265
* ζ Capricorni . . . . .	3.8	21	20	54.128	3.4329	- 22	50	56.41	15.414
ι Draconis (H.) . . . S. P.	4.5	21	22	42.403	+ 8.9246	+ 98	13	37.51	+15.530

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
<i>δ</i> Ursæ Majoris . S. P.	4.8	21 25 33.255	+ 5.3848	+109 43 32.96	+15.608
<i>β</i> Aquarii . . . .	2.9	21 26 14.553	3.1611	— 6 0 56.33	15.689
<i>β</i> Cephei ( <i>pr.</i> ) . . .	3.4	21 27 21.436	0.7908	+ 70 7 1.91	15.763
<i>ε</i> Aquarii . . . .	4.8	21 32 22.570	3.1971	— 8 18 26.20	15.998
* 74 Cygni . . . .	5.0	21 32 54.028	2.4022	+ 39 57 34.21	16.072
* <i>λ</i> <sup>1</sup> Octantis . . . .	5.4	21 35 25.857	+ 9.6824	— 83 11 1.44	+16.116
* <i>ζ</i> Chamæleontis . S. P.	5.2	21 36 52.182	— 1.5901	— 99 30 44.50	16.273
* <i>ε</i> Pegasi . . . .	2.4	21 39 13.545	+ 2.9467	+ 9 24 42.59	16.380
* <i>ι</i> <sup>1</sup> Cephei . . . .	4.8	21 40 26.729	0.8982	+ 70 50 46.93	16.546
* <i>π</i> <sup>3</sup> Cygni . . . .	4.5	21 43 3.703	2.2140	+ 48 50 31.72	16.560
* <i>μ</i> Capricorni . . . .	5.2	21 47 47.407	+ 3.2749	— 14 1 38.44	+16.805
* 16 Pegasi . . . .	5.1	21 48 27.973	2.7284	+ 25 26 59.40	16.840
79 Draconis . . . .	6.6	21 51 36.178	0.7247	+ 73 13 28.20	17.018
<i>α</i> Aquarii . . . .	3.0	22 0 35.791	3.0823	— 0 48 38.24	17.378
<i>α</i> Gruis . . . .	1.9	22 1 52.125	3.8017	— 47 27 0.34	17.274
* <i>π</i> Pegasi . . . .	4.3	22 5 30.080	+ 2.6609	+ 32 40 57.66	+17.598
32 Ursæ Majoris . S. P.	5.7	22 10 42.181	4.4099	+114 23 16.73	17.840
* <i>θ</i> Aquarii . . . .	4.4	22 11 30.270	3.1684	— 8 17 10.65	17.822
* <i>υ</i> Octantis . . . .	6.2	22 12 21.958	12.8470	— 86 28 50.76	17.973
* <i>γ</i> Aquarii . . . .	4.0	22 16 26.366	3.1004	— 1 53 46.90	18.058
* <i>π</i> Aquarii . . . .	4.6	22 20 7.159	+ 3.0645	+ 0 51 53.27	+18.173
* <i>σ</i> Aquarii . . . .	4.9	22 25 18.116	3.1774	— 11 11 41.35	18.336
* 9 Draconis (H.) . S. P.	5.0	22 26 31.505	3.2366	+103 46 0.58	18.424
* <i>α</i> Lacertæ . . . .	3.9	22 27 7.741	2.4638	+ 49 45 46.99	18.428
* <i>η</i> Aquarii . . . .	4.2	22 30 9.983	3.0833	— 0 38 17.30	18.474
226 Cephei (B.) . . .	5.7	22 30 30.217	+ 1.0742	+ 75 42 21.14	+18.534
* 10 Lacertæ . . . .	5.0	22 34 43.720	2.6879	+ 38 31 28.34	18.682
* <i>β</i> Octantis . . . .	4.4	22 35 44.551	6.4225	— 81 54 39.04	18.715
* <i>ζ</i> Pegasi . . . .	3.5	22 36 25.486	2.9912	+ 10 16 14.64	18.721
* <i>λ</i> Pegasi . . . .	4.1	22 41 39.928	2.8860	+ 23 2 2.75	18.888
* <i>ι</i> Cephei . . . .	3.6	22 46 4.908	+ 2.1240	+ 65 40 8.58	+18.886
* <i>λ</i> Aquarii . . . .	3.8	22 47 20.763	3.1322	— 8 7 1.36	19.088
* Groombr. 1706 . S. P.	6.3	22 51 52.927	4.9395	+101 41 19.27	19.202
* <i>α</i> Pis. Aust. ( <i>Fomalhaut</i> ). .	1.3	22 52 4.196	3.3228	— 30 9 27.31	19.007
* <i>ο</i> Andromedæ . . . .	3.8	22 57 16.354	2.7517	+ 41 46 58.64	19.297
* <i>α</i> Ursæ Majoris . S. P.	2.0	22 57 29.831	+ 3.7398	+117 42 13.35	+19.377
* <i>α</i> Pegasi ( <i>Markab</i> ). . .	2.5	22 59 43.762	2.9856	+ 14 39 42.20	19.312
* <i>φ</i> Aquarii . . . .	4.3	23 9 5.536	3.1084	— 6 35 36.42	19.367
* <i>ο</i> Cephei . . . .	5.1	23 14 28.681	2.4479	+ 67 33 32.28	19.676
* <i>τ</i> Pegasi . . . .	4.6	23 15 38.220	2.9646	+ 23 11 14.31	19.663
* <i>θ</i> Piscium . . . .	4.3	23 22 50.653	+ 3.0414	+ 5 49 26.43	+19.733
* <i>λ</i> Draconis . . . S. P.	4.0	23 25 24.540	3.6109	+110 6 41.44	19.845
* <i>λ</i> Andromedæ . . . .	3.8	23 32 37.178	2.9248	+ 45 54 38.26	19.477
* <i>ι</i> Piscium . . . .	4.3	23 34 45.313	3.0844	+ 5 4 43.76	19.488
* <i>γ</i> Cephei . . . .	3.5	23 35 11.737	2.4225	+ 77 4 6.66	20.078
* <i>ι</i> <sup>1</sup> Aquarii . . . .	5.2	23 38 57.849	+ 3.1160	— 18 50 14.80	+19.963
* <i>δ</i> Sculptoris . . . .	4.6	23 43 39.963	3.1310	— 28 41 19.20	19.859
* <i>γ</i> <sup>1</sup> Octantis . . . .	5.2	23 46 10.423	3.6583	— 82 34 48.64	19.996
* Groombridge 4163 . . .	6.6	23 49 55.037	2.8738	+ 73 50 53.58	20.024
* <i>ω</i> Piscium . . . .	4.2	23 54 7.479	3.0789	+ 6 18 14.81	19.931
* 33 Piscium . . . .	4.7	24 0 9.949	+ 3.0707	— 6 16 20.82	+20.147

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.



## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.
Jan.	<sup>h</sup> <sup>m</sup> 1 21	+88 46	Jan.	<sup>h</sup> <sup>m</sup> 6 53	+87 12	Jan.	<sup>h</sup> <sup>m</sup> 18 4	+86 36	Jan.	<sup>h</sup> <sup>m</sup> 19 21	+88 59
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
0.3	86.71	34.8	0.5	51.89	22.9	0.9	22.78	43.1	0.0	58.13	14.3
1.3	85.66	34.9	1.5	51.97	23.2	1.9	22.81	42.7	1.0	57.71	14.0
2.3	84.63	35.0	2.5	52.03	23.6	2.9	22.84	42.4	2.0	57.39	13.6
3.3	83.64	35.1	3.5	52.06	23.9	3.9	22.89	42.1	3.0	57.14	13.3
4.3	82.71	35.1	4.5	52.11	24.2	4.9	22.95	41.8	4.0	56.92	13.0
5.3	81.82	35.2	5.5	52.14	24.5	5.9	22.98	41.5	5.0	56.69	12.7
6.3	80.97	35.2	6.5	52.21	24.7	6.9	23.01	41.2	6.0	56.45	12.4
7.3	80.13	35.3	7.5	52.30	25.0	7.9	23.03	40.9	7.0	56.19	12.2
8.3	79.28	35.4	8.5	52.39	25.3	8.9	23.06	40.6	8.0	55.88	11.9
9.3	78.39	35.5	9.5	52.49	25.6	9.9	23.08	40.3	9.0	55.53	11.6
10.2	77.46	35.6	10.5	52.60	25.9	10.9	23.10	39.9	10.0	55.17	11.3
11.2	76.47	35.7	11.5	52.68	26.2	11.9	23.15	39.6	11.0	54.81	11.0
12.2	75.42	35.8	12.5	52.74	26.6	12.9	23.23	39.2	12.0	54.50	10.6
13.2	74.34	35.8	13.5	52.77	26.9	13.9	23.32	38.9	13.0	54.25	10.3
14.2	73.25	35.9	14.5	52.76	27.3	14.9	23.43	38.5	13.9	54.09	9.9
15.2	72.17	35.9	15.5	52.73	27.6	15.9	23.57	38.2	14.9	54.01	9.6
16.2	71.13	35.9	16.5	52.66	27.9	16.9	23.72	37.9	15.9	54.01	9.2
17.2	70.12	35.9	17.5	52.58	28.2	17.9	23.86	37.6	16.9	54.06	8.9
18.2	69.17	35.8	18.5	52.50	28.5	18.9	24.02	37.3	17.9	54.17	8.6
19.2	68.27	35.8	19.5	52.42	28.8	19.9	24.16	37.0	18.9	54.29	8.3
20.2	67.40	35.8	20.4	52.36	29.1	20.9	24.29	36.8	19.9	54.39	8.0
21.2	66.53	35.8	21.4	52.32	29.4	21.9	24.42	36.5	20.9	54.46	7.7
22.2	65.64	35.8	22.4	52.27	29.6	22.9	24.54	36.2	21.9	54.52	7.4
23.2	64.73	35.7	23.4	52.25	29.9	23.9	24.67	35.9	22.9	54.54	7.1
24.2	63.75	35.7	24.4	52.20	30.2	24.9	24.81	35.6	23.9	54.55	6.8
25.2	62.73	35.7	25.4	52.15	30.5	25.9	24.96	35.3	24.9	54.58	6.5
26.2	61.69	35.7	26.4	52.06	30.9	26.9	25.14	35.0	25.9	54.68	6.2
27.2	60.60	35.7	27.4	51.93	31.2	27.9	25.35	34.7	26.9	54.84	5.8
28.2	59.50	35.6	28.4	51.78	31.5	28.9	25.57	34.4	27.9	55.06	5.5
29.2	58.44	35.5	29.4	51.61	31.9	29.9	25.80	34.1	28.9	55.37	5.1
30.2	57.42	35.4	30.4	51.41	32.2	30.9	26.05	33.8	29.9	55.75	4.8
31.2	56.47	35.3	31.4	51.19	32.4	31.9	26.30	33.6	30.9	56.19	4.5
32.2	55.58	35.1	32.4	50.98	32.7	32.9	26.52	33.3	31.9	56.63	4.2

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hzv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Feb.	<sup>h</sup> <sup>m</sup> 1 21	+88 46	Feb.	<sup>h</sup> <sup>m</sup> 6 53	+87 12	Feb.	<sup>h</sup> <sup>m</sup> 18 4	+86 36	Feb.	<sup>h</sup> <sup>m</sup> 19 21	+88 58
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.2	55.58	35.1	1.4	50.98	32.7	1.9	26.52	33.3	1.9	57.08	63.9
2.2	54.74	35.0	2.4	50.80	33.0	2.9	26.74	33.1	2.9	57.49	63.6
3.2	53.92	34.9	3.4	50.63	33.2	3.9	26.95	32.9	3.9	57.87	63.4
4.2	53.12	34.8	4.4	50.48	33.4	4.9	27.17	32.7	4.9	58.19	63.1
5.2	52.32	34.7	5.4	50.33	33.7	5.9	27.36	32.4	5.9	58.51	62.8
6.2	51.47	34.7	6.4	50.20	33.9	6.9	27.58	32.2	6.9	58.82	62.5
7.2	50.57	34.6	7.4	50.06	34.2	7.9	27.79	31.9	7.9	59.14	62.2
8.2	49.63	34.5	8.4	49.88	34.5	8.9	28.01	31.7	8.9	59.52	61.9
9.2	48.67	34.4	9.4	49.69	34.8	9.9	28.27	31.4	9.9	59.98	61.6
10.2	47.67	34.2	10.4	49.47	35.1	10.9	28.54	31.1	10.9	60.51	61.3
11.2	46.71	34.1	11.4	49.21	35.4	11.9	28.84	30.9	11.9	61.14	61.0
12.2	45.77	33.9	12.4	48.93	35.7	12.9	29.15	30.7	12.9	61.83	60.7
13.2	44.89	33.7	13.4	48.63	35.9	13.9	29.44	30.5	13.9	62.57	60.4
14.2	44.06	33.5	14.4	48.31	36.2	14.9	29.75	30.3	14.9	63.31	60.1
15.1	43.30	33.3	15.4	48.00	36.4	15.9	30.06	30.1	15.9	64.05	59.9
16.1	42.59	33.1	16.4	47.72	36.6	16.8	30.35	30.0	16.9	64.77	59.7
17.1	41.91	33.0	17.4	47.43	36.8	17.8	30.63	29.8	17.9	65.46	59.4
18.1	41.21	32.8	18.4	47.18	37.0	18.8	30.90	29.7	18.9	66.12	59.2
19.1	40.52	32.6	19.4	46.93	37.2	19.8	31.17	29.5	19.9	66.74	59.0
20.1	39.79	32.4	20.4	46.67	37.4	20.8	31.46	29.3	20.9	67.38	58.8
21.1	39.01	32.3	21.4	46.40	37.6	21.8	31.74	29.1	21.9	68.06	58.5
22.1	38.19	32.1	22.4	46.12	37.8	22.8	32.06	28.9	22.9	68.78	58.2
23.1	37.35	31.9	23.4	45.80	38.1	23.8	32.39	28.7	23.9	69.57	57.9
24.1	36.51	31.7	24.3	45.46	38.3	24.8	32.75	28.6	24.9	70.44	57.7
25.1	35.69	31.4	25.3	45.09	38.6	25.8	33.10	28.4	25.9	71.37	57.4
26.1	34.92	31.2	26.3	44.71	38.8	26.8	33.46	28.2	26.9	72.35	57.2
27.1	34.21	30.9	27.3	44.30	39.0	27.8	33.84	28.1	27.9	73.36	57.0
28.1	33.58	30.6	28.3	43.90	39.1	28.8	34.20	28.1	28.9	74.37	56.8
29.1	33.02	30.4	29.3	43.52	39.2	29.8	34.54	28.0	29.9	75.35	56.6

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Mar.	<sup>h</sup> <sup>m</sup> 1 21	+88 46	Mar.	<sup>h</sup> <sup>m</sup> 6 53	+87 12	Mar.	<sup>h</sup> <sup>m</sup> 18 4	+86 36	Mar.	<sup>h</sup> <sup>m</sup> 19 22	+88 58
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.1	33.02	30.4	1.3	43.52	39.2	1.8	34.54	28.0	1.9	15.35	56.6
2.1	32.49	30.1	2.3	43.15	39.4	2.8	34.86	27.9	2.9	16.29	56.5
3.1	32.00	29.9	3.3	42.81	39.5	3.8	35.19	27.8	3.9	17.17	56.3
4.1	31.51	29.6	4.3	42.50	39.6	4.8	35.51	27.8	4.9	18.02	56.1
5.1	31.01	29.4	5.3	42.17	39.8	5.8	35.80	27.7	5.9	18.83	56.0
6.1	30.48	29.2	6.3	41.87	39.9	6.8	36.11	27.6	6.9	19.66	55.8
7.1	29.89	29.0	7.3	41.55	40.1	7.8	36.44	27.4	7.9	20.52	55.6
8.1	29.28	28.8	8.3	41.21	40.2	8.8	36.77	27.3	8.9	21.42	55.4
9.1	28.66	28.5	9.3	40.84	40.4	9.8	37.12	27.2	9.8	22.41	55.2
10.1	28.05	28.3	10.3	40.43	40.6	10.8	37.51	27.1	10.8	23.47	55.0
11.1	27.46	28.0	11.3	40.01	40.7	11.8	37.90	27.0	11.8	24.59	54.8
12.1	26.95	27.7	12.3	39.57	40.8	12.8	38.29	27.0	12.8	25.76	54.6
13.1	26.50	27.4	13.3	39.12	40.9	13.8	38.67	27.0	13.8	26.94	54.5
14.1	26.11	27.0	14.3	38.67	41.0	14.8	39.05	27.0	14.8	28.13	54.4
15.1	25.79	26.7	15.3	38.24	41.1	15.8	39.42	27.0	15.8	29.26	54.3
16.1	25.51	26.4	16.3	37.82	41.1	16.8	39.77	27.0	16.8	30.37	54.2
17.1	25.26	26.1	17.3	37.44	41.2	17.8	40.10	27.0	17.8	31.42	54.1
18.1	24.99	25.9	18.3	37.06	41.2	18.8	40.45	27.0	18.8	32.44	54.0
19.1	24.71	25.6	19.3	36.70	41.3	19.8	40.77	27.0	19.8	33.45	53.9
20.1	24.38	25.3	20.3	36.32	41.4	20.8	41.11	27.0	20.8	34.46	53.8
21.1	24.02	25.1	21.3	35.94	41.5	21.8	41.45	27.0	21.8	35.53	53.7
22.0	23.64	24.8	22.3	35.53	41.5	22.7	41.83	26.9	22.8	36.62	53.6
23.0	23.25	24.5	23.3	35.10	41.6	23.7	42.21	26.9	23.8	37.80	53.4
24.0	22.87	24.2	24.3	34.64	41.7	24.7	42.59	26.9	24.8	39.02	53.3
25.0	22.55	23.8	25.3	34.17	41.8	25.7	42.99	26.9	25.8	40.30	53.2
26.0	22.29	23.5	26.3	33.69	41.8	26.7	43.38	27.0	26.8	41.59	53.2
27.0	22.10	23.1	27.3	33.21	41.8	27.7	43.78	27.1	27.8	42.90	53.1
28.0	21.98	22.8	28.3	32.75	41.8	28.7	44.14	27.2	28.8	44.17	53.1
29.0	21.93	22.5	29.3	32.29	41.8	29.7	44.49	27.3	29.8	45.37	53.1
30.0	21.91	22.2	30.3	31.88	41.8	30.7	44.83	27.4	30.8	46.54	53.1
31.0	21.90	21.9	31.3	31.49	41.7	31.7	45.15	27.5	31.8	47.63	53.1
32.0	21.91	21.6	32.2	31.11	41.7	32.7	45.47	27.6	32.8	48.69	53.1

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Apr.	h m 1 21	+88 46	Apr	h m 6 53	+87 12	Apr.	h m 18 4	+86 36	Apr.	h m 19 22	+88 58
	s	"		s	"		s	"		s	"
1.0	21.91	21.6	1.2	31.11	41.7	1.7	45.47	27.6	1.8	48.69	53.1
2.0	21.88	21.3	2.2	30.76	41.7	2.7	45.77	27.6	2.8	49.71	53.0
3.0	21.82	21.0	3.2	30.40	41.7	3.7	46.08	27.7	3.8	50.75	53.0
4.0	21.73	20.7	4.2	30.02	41.7	4.7	46.41	27.7	4.8	51.81	53.0
5.0	21.62	20.5	5.2	29.61	41.7	5.7	46.75	27.8	5.8	52.95	52.9
6.0	21.50	20.1	6.2	29.19	41.7	6.7	47.10	27.9	6.8	54.13	52.9
7.0	21.42	19.8	7.2	28.74	41.7	7.7	47.47	28.0	7.8	55.39	52.9
8.0	21.39	19.5	8.2	28.28	41.6	8.7	47.85	28.1	8.8	56.68	52.9
9.0	21.41	19.1	9.2	27.81	41.6	9.7	48.21	28.2	9.8	57.98	52.9
10.0	21.52	18.8	10.2	27.35	41.5	10.7	48.56	28.4	10.8	59.29	52.9
10.9	21.68	18.5	11.2	26.90	41.4	11.7	48.90	28.6	11.8	60.56	53.0
11.9	21.91	18.1	12.2	26.47	41.3	12.7	49.22	28.7	12.8	61.75	53.1
12.9	22.16	17.8	13.2	26.07	41.2	13.7	49.52	28.9	13.8	62.91	53.2
13.9	22.41	17.5	14.2	25.70	41.1	14.7	49.81	29.1	14.8	64.02	53.2
14.9	22.66	17.2	15.2	25.34	41.0	15.7	50.09	29.2	15.8	65.08	53.3
15.9	22.88	17.0	16.2	24.98	40.9	16.7	50.37	29.4	16.8	66.12	53.4
16.9	23.05	16.7	17.2	24.63	40.8	17.7	50.66	29.5	17.7	67.17	53.4
17.9	23.19	16.4	18.2	24.26	40.7	18.7	50.96	29.7	18.7	68.29	53.4
18.9	23.31	16.1	19.2	23.86	40.6	19.7	51.28	29.8	19.7	69.44	53.5
19.9	23.46	15.8	20.2	23.45	40.6	20.7	51.61	30.0	20.7	70.64	53.5
20.9	23.62	15.5	21.2	23.01	40.5	21.7	51.94	30.1	21.7	71.87	53.6
21.9	23.84	15.2	22.2	22.57	40.4	22.7	52.26	30.3	22.7	73.14	53.7
22.9	24.14	14.8	23.2	22.14	40.2	23.7	52.58	30.5	23.7	74.40	53.8
23.9	24.52	14.5	24.2	21.70	40.1	24.7	52.89	30.8	24.7	75.62	53.9
24.9	24.97	14.2	25.2	21.30	39.9	25.7	53.16	31.0	25.7	76.80	54.1
25.9	25.45	13.9	26.2	20.94	39.7	26.7	53.42	31.3	26.7	77.88	54.2
26.9	25.96	13.6	27.2	20.61	39.5	27.7	53.66	31.5	27.7	78.91	54.4
27.9	26.47	13.3	28.2	20.28	39.3	28.7	53.90	31.8	28.7	79.88	54.6
28.9	26.96	13.1	29.2	19.99	39.1	29.6	54.11	32.0	29.7	80.80	54.7
29.9	27.42	12.8	30.2	19.71	39.0	30.6	54.33	32.2	30.7	81.71	54.9
30.9	27.85	12.6	31.2	19.41	38.8	31.6	54.55	32.4	31.7	82.64	55.0
31.9	28.23	12.4									

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hev.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
May	<sup>h</sup> <sup>m</sup> 1 21	+88 46	May	<sup>h</sup> <sup>m</sup> 6 53	+87 12	May	<sup>h</sup> <sup>m</sup> 18 4	+86 36	May	<sup>h</sup> <sup>m</sup> 19 23	+88 58
	"	"		"	"		"	"		"	"
1.9	28.23	12.4	1.2	19.41	38.8	1.6	54.55	32.4	1.7	22.64	55.0
2.9	28.62	12.1	2.2	19.11	38.7	2.6	54.78	32.6	2.7	23.59	55.1
3.9	29.00	11.8	3.2	18.78	38.5	3.6	55.03	32.8	3.7	24.60	55.2
4.9	29.45	11.6	4.2	18.44	38.4	4.6	55.28	33.0	4.7	25.66	55.4
5.9	29.93	11.3	5.2	18.07	38.2	5.6	55.55	33.3	5.7	26.77	55.5
6.9	30.49	11.0	6.2	17.70	38.0	6.6	55.80	33.6	6.7	27.88	55.6
7.9	31.11	10.7	7.1	17.34	37.8	7.6	56.04	33.8	7.7	28.98	55.8
8.9	31.80	10.4	8.1	16.99	37.6	8.6	56.27	34.1	8.6	30.05	56.1
9.9	32.53	10.2	9.1	16.66	37.3	9.6	56.49	34.4	9.6	31.06	56.3
10.9	33.25	9.9	10.1	16.36	37.1	10.6	56.66	34.7	10.6	32.01	56.5
11.9	33.97	9.7	11.1	16.09	36.8	11.6	56.83	35.0	11.6	32.88	56.7
12.9	34.65	9.5	12.1	15.86	36.6	12.6	56.99	35.3	12.6	33.70	56.9
13.9	35.32	9.3	13.1	15.62	36.3	13.6	57.15	35.6	13.6	34.46	57.2
14.9	35.92	9.1	14.1	15.40	36.1	14.6	57.31	35.8	14.6	35.25	57.4
15.9	36.48	8.9	15.1	15.16	35.9	15.6	57.46	36.1	15.6	36.04	57.6
16.9	37.06	8.7	16.1	14.91	35.7	16.6	57.64	36.4	16.6	36.88	57.7
17.9	37.66	8.4	17.1	14.64	35.5	17.6	57.81	36.6	17.6	37.75	57.9
18.9	38.29	8.2	18.1	14.35	35.3	18.6	58.01	36.9	18.6	38.67	58.1
19.9	39.00	7.9	19.1	14.06	35.0	19.6	58.20	37.2	19.6	39.60	58.3
20.9	39.75	7.7	20.1	13.76	34.8	20.6	58.38	37.5	20.6	40.53	58.6
21.9	40.58	7.4	21.1	13.47	34.5	21.6	58.55	37.8	21.6	41.44	58.8
22.9	41.45	7.2	22.1	13.21	34.2	22.6	58.69	38.2	22.6	42.29	59.1
23.9	42.36	7.0	23.1	12.99	33.9	23.6	58.79	38.5	23.6	43.06	59.4
24.9	43.27	6.9	24.1	12.78	33.6	24.6	58.89	38.8	24.6	43.76	59.7
25.9	44.17	6.7	25.1	12.63	33.3	25.6	58.98	39.2	25.6	44.38	60.0
26.9	45.03	6.6	26.1	12.49	33.0	26.6	59.05	39.5	26.6	44.94	60.3
27.9	45.84	6.5	27.1	12.36	32.7	27.6	59.11	39.8	27.6	45.46	60.5
28.9	46.62	6.3	28.1	12.24	32.5	28.6	59.17	40.1	28.6	45.98	60.8
29.9	47.37	6.2	29.1	12.11	32.2	29.6	59.25	40.3	29.6	46.53	61.0
30.9	48.12	6.0	30.1	11.97	32.0	30.6	59.33	40.6	30.6	47.12	61.3
31.9	48.90	5.9	31.1	11.80	31.8	31.6	59.41	40.9	31.6	47.73	61.5
32.9	49.70	5.7	32.1	11.61	31.5	32.6	59.51	41.2	32.6	48.41	61.8

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
June	<sup>h</sup> <sup>m</sup> 1 21	+88° 46'	June	<sup>h</sup> <sup>m</sup> 6 53	+87° 12'	June	<sup>h</sup> <sup>m</sup> 18 4	+86° 36'	June	<sup>h</sup> <sup>m</sup> 19 23	+88° 59'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.9	49.70	5.7	1.1	11.61	31.5	1.6	59.51	41.2	1.6	48.41	1.8
2.9	50.58	5.6	2.1	11.42	31.2	2.6	59.61	41.5	2.6	49.08	2.0
3.8	51.52	5.4	3.1	11.24	30.9	3.5	59.70	41.9	3.6	49.76	2.3
4.8	52.51	5.2	4.1	11.07	30.6	4.5	59.76	42.2	4.6	50.40	2.6
5.8	53.54	5.1	5.1	10.90	30.3	5.5	59.82	42.6	5.6	50.99	3.0
6.8	54.58	5.0	6.1	10.79	29.9	6.5	59.84	42.9	6.6	51.50	3.3
7.8	55.62	4.9	7.1	10.69	29.6	7.5	59.85	43.3	7.6	51.95	3.6
8.8	56.62	4.8	8.1	10.63	29.3	8.5	59.83	43.7	8.6	52.32	4.0
9.8	57.58	4.7	9.1	10.57	28.9	9.5	59.83	44.0	9.6	52.65	4.3
10.8	58.48	4.6	10.1	10.55	28.6	10.5	59.81	44.3	10.6	52.94	4.6
11.8	59.35	4.5	11.1	10.51	28.3	11.5	59.79	44.6	11.6	53.24	4.8
12.8	60.20	4.4	12.1	10.46	28.1	12.5	59.78	44.9	12.6	53.59	5.1
13.8	61.05	4.4	13.0	10.39	27.8	13.5	59.79	45.2	13.6	53.95	5.4
14.8	61.92	4.3	14.0	10.30	27.5	14.5	59.82	45.5	14.6	54.34	5.7
15.8	62.85	4.2	15.0	10.22	27.2	15.5	59.83	45.8	15.6	54.78	6.0
16.8	63.83	4.0	16.0	10.12	26.9	16.5	59.84	46.1	16.6	55.21	6.3
17.8	64.88	3.9	17.0	10.04	26.6	17.5	59.84	46.5	17.6	55.63	6.6
18.8	65.97	3.9	18.0	9.96	26.3	18.5	59.83	46.8	18.6	55.99	6.9
19.8	67.10	3.8	19.0	9.93	25.9	19.5	59.77	47.2	19.6	56.28	7.3
20.8	68.23	3.8	20.0	9.92	25.6	20.5	59.70	47.6	20.6	56.48	7.6
21.8	69.35	3.7	21.0	9.96	25.2	21.5	59.61	48.0	21.6	56.59	8.0
22.8	70.43	3.7	22.0	10.01	24.8	22.5	59.51	48.3	22.6	56.66	8.4
23.8	71.45	3.8	23.0	10.10	24.5	23.5	59.39	48.6	23.6	56.65	8.7
24.8	72.44	3.8	24.0	10.18	24.2	24.5	59.28	48.9	24.6	56.63	9.0
25.8	73.39	3.8	25.0	10.26	23.9	25.5	59.17	49.2	25.6	56.61	9.3
26.8	74.32	3.8	26.0	10.32	23.6	26.5	59.07	49.5	26.6	56.63	9.6
27.8	75.24	3.8	27.0	10.38	23.3	27.5	59.00	49.8	27.6	56.69	9.9
28.8	76.21	3.7	28.0	10.41	23.0	28.5	58.91	50.1	28.6	56.79	10.2
29.8	77.22	3.7	29.0	10.44	22.7	29.5	58.83	50.4	29.5	56.91	10.6
30.8	78.28	3.7	30.0	10.45	22.4	30.5	58.75	50.7	30.5	57.05	10.9
31.8	79.39	3.7	31.0	10.49	22.1	31.5	58.63	51.1	31.5	57.15	11.2

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
July	h m 1 22	+88 46	July	h m 6 53	+87 12	July	h m 18 4	+86 36	July	h m 19 23	+88 59
	s	"		s	"		s	"		s	"
1.8	19.39	3.7	1.0	10.49	22.1	1.5	58.63	51.1	1.5	57.15	11.2
2.8	20.54	3.7	2.0	10.52	21.7	2.5	58.52	51.4	2.5	57.20	11.6
3.8	21.71	3.7	3.0	10.61	21.4	3.5	58.40	51.8	3.5	57.18	12.0
4.8	22.87	3.7	3.9	10.71	21.0	4.5	58.24	52.1	4.5	57.10	12.4
5.8	24.00	3.8	4.9	10.84	20.6	5.5	58.06	52.5	5.5	56.94	12.7
6.8	25.10	3.9	5.9	11.01	20.3	6.5	57.87	52.8	6.5	56.72	13.1
7.8	26.13	3.9	6.9	11.17	20.0	7.5	57.69	53.1	7.5	56.46	13.4
8.8	27.11	4.0	7.9	11.34	19.7	8.5	57.50	53.4	8.5	56.19	13.8
9.8	28.03	4.1	8.9	11.51	19.4	9.5	57.31	53.6	9.5	55.93	14.1
10.7	28.96	4.1	9.9	11.65	19.1	10.5	57.15	53.9	10.5	55.73	14.4
11.7	29.89	4.2	10.9	11.79	18.8	11.5	57.00	54.2	11.5	55.54	14.7
12.7	30.85	4.2	11.9	11.92	18.5	12.4	56.85	54.5	12.5	55.41	15.0
13.7	31.87	4.3	12.9	12.02	18.2	13.4	56.68	54.8	13.5	55.27	15.3
14.7	32.93	4.3	13.9	12.14	17.9	14.4	56.52	55.1	14.5	55.13	15.6
15.7	34.05	4.4	14.9	12.26	17.6	15.4	56.34	55.4	15.5	54.95	16.0
16.7	35.20	4.4	15.9	12.41	17.2	16.4	56.14	55.7	16.5	54.70	16.3
17.7	36.36	4.5	16.9	12.60	16.9	17.4	55.90	56.0	17.5	54.38	16.7
18.7	37.50	4.7	17.9	12.81	16.6	18.4	55.66	56.4	18.5	53.97	17.1
19.7	38.63	4.8	18.9	13.07	16.2	19.4	55.40	56.7	19.5	53.49	17.4
20.7	39.68	5.0	19.9	13.35	15.9	20.4	55.13	56.9	20.5	52.94	17.8
21.7	40.68	5.1	20.9	13.63	15.6	21.4	54.84	57.2	21.5	52.36	18.1
22.7	41.63	5.3	21.9	13.92	15.3	22.4	54.57	57.4	22.5	51.78	18.4
23.7	42.54	5.4	22.9	14.20	15.0	23.4	54.31	57.7	23.5	51.23	18.7
24.7	43.46	5.6	23.9	14.43	14.8	24.4	54.06	57.9	24.5	50.71	19.0
25.7	44.37	5.7	24.9	14.67	14.5	25.4	53.82	58.2	25.5	50.24	19.3
26.7	45.33	5.8	25.9	14.90	14.2	26.4	53.58	58.4	26.5	49.80	19.6
27.7	46.33	6.0	26.9	15.12	14.0	27.4	53.34	58.7	27.5	49.37	19.9
28.7	47.37	6.1	27.9	15.33	13.7	28.4	53.11	58.9	28.5	48.93	20.3
29.7	48.46	6.2	28.9	15.57	13.3	29.4	52.83	59.2	29.5	48.45	20.6
30.7	49.57	6.4	29.9	15.83	13.0	30.4	52.57	59.5	30.5	47.91	21.0
31.7	50.68	6.5	30.9	16.12	12.7	31.4	52.27	59.8	31.5	47.30	21.3
32.7	51.76	6.7	31.9	16.43	12.4	32.4	51.94	60.1	32.5	46.61	21.7

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\zeta$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.
Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '
	I 22	+88 46		6 53	+87 12		18 4	+86 37		19 23	+88 59
	s	"		s	"		s	"		s	"
1.7	51.76	6.7	1.9	16.78	12.1	1.4	51.94	0.1	1.5	46.61	21.7
2.7	52.79	7.0	2.9	17.13	11.8	2.4	51.63	0.3	2.4	45.87	22.0
3.7	53.76	7.2	3.9	17.48	11.5	3.4	51.29	0.6	3.4	45.08	22.3
4.7	54.66	7.4	4.9	17.83	11.3	4.4	50.96	0.8	4.4	44.27	22.6
5.7	55.52	7.6	5.9	18.17	11.0	5.4	50.64	1.0	5.4	43.48	22.9
6.7	56.36	7.8	6.9	18.49	10.8	6.4	50.32	1.2	6.4	42.72	23.2
7.7	57.17	8.0	7.9	18.79	10.6	7.4	50.03	1.4	7.4	42.00	23.4
8.7	58.01	8.2	8.9	19.09	10.3	8.4	49.74	1.5	8.4	41.31	23.7
9.7	58.90	8.4	9.9	19.36	10.1	9.4	49.45	1.7	9.4	40.65	24.0
10.7	59.81	8.5	10.9	19.66	9.8	10.4	49.14	2.0	10.4	40.00	24.3
11.7	60.78	8.7	11.9	19.97	9.5	11.4	48.84	2.2	11.4	39.32	24.6
12.7	61.79	8.9	12.9	20.31	9.2	12.4	48.53	2.4	12.4	38.59	24.9
13.7	62.81	9.2	13.9	20.68	8.9	13.4	48.18	2.7	13.4	37.78	25.2
14.7	63.82	9.4	14.9	21.09	8.6	14.4	47.81	2.9	14.4	36.89	25.6
15.6	64.79	9.7	15.9	21.53	8.4	15.4	47.42	3.1	15.4	35.94	25.9
16.6	65.72	9.9	16.9	21.98	8.1	16.3	47.04	3.3	16.4	34.90	26.2
17.6	66.58	10.2	17.9	22.42	7.9	17.3	46.63	3.5	17.4	33.85	26.5
18.6	67.39	10.5	18.9	22.86	7.7	18.3	46.24	3.7	18.4	32.78	26.7
19.6	68.14	10.8	19.9	23.28	7.5	19.3	45.85	3.8	19.4	31.71	27.0
20.6	68.88	11.1	20.9	23.69	7.3	20.3	45.50	3.9	20.4	30.70	27.2
21.6	69.60	11.3	21.9	24.08	7.1	21.3	45.13	4.1	21.4	29.72	27.5
22.6	70.37	11.6	22.9	24.45	6.9	22.3	44.78	4.2	22.4	28.80	27.7
23.6	71.15	11.8	23.9	24.81	6.7	23.3	44.45	4.4	23.4	27.90	27.9
24.6	71.99	12.0	24.8	25.20	6.5	24.3	44.09	4.5	24.4	26.99	28.2
25.6	72.86	12.3	25.8	25.59	6.2	25.3	43.74	4.7	25.4	26.06	28.5
26.6	73.75	12.5	26.8	26.01	6.0	26.3	43.35	4.9	26.4	25.10	28.8
27.6	74.65	12.8	27.8	26.45	5.7	27.3	42.97	5.1	27.4	24.05	29.0
28.6	75.53	13.1	28.8	26.93	5.5	28.3	42.56	5.3	28.4	22.94	29.3
29.6	76.34	13.4	29.8	27.42	5.3	29.3	42.13	5.4	29.4	21.78	29.6
30.6	77.12	13.8	30.8	27.90	5.1	30.3	41.70	5.5	30.4	20.56	29.8
31.6	77.83	14.1	31.8	28.40	4.9	31.3	41.27	5.6	31.4	19.33	30.1
32.6	78.46	14.4	32.8	28.89	4.8	32.3	40.85	5.7	32.4	18.09	30.3



## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Sept.	h m	°	Sept.	h m	°	Sept.	h m	°	Sept.	h m	°
	1 23	+88 46		6 53	+87 12		18 4	+86 37		19 22	+88 59
	"	"		"	"		"	"		"	"
1.6	18.46	14.4	1.8	28.89	4.8	1.3	40.85	5.7	1.4	78.09	30.3
2.6	19.05	14.7	2.8	29.34	4.6	2.3	40.45	5.8	2.4	76.90	30.5
3.6	19.62	15.0	3.8	29.78	4.5	3.3	40.05	5.9	3.4	75.75	30.7
4.6	20.20	15.3	4.8	30.20	4.3	4.3	39.67	6.0	4.4	74.64	30.9
5.6	20.80	15.6	5.8	30.60	4.2	5.3	39.30	6.1	5.4	73.57	31.0
6.6	21.44	15.9	6.8	31.03	4.0	6.3	38.92	6.2	6.4	72.52	31.2
7.6	22.14	16.2	7.8	31.45	3.8	7.3	38.54	6.3	7.4	71.46	31.5
8.6	22.86	16.5	8.8	31.89	3.7	8.3	38.14	6.4	8.4	70.36	31.7
9.6	23.60	16.8	9.8	32.37	3.5	9.3	37.75	6.5	9.4	69.20	31.9
10.6	24.35	17.1	10.8	32.88	3.3	10.3	37.31	6.6	10.3	67.98	32.2
11.6	25.05	17.5	11.8	33.41	3.1	11.3	36.86	6.7	11.3	66.67	32.4
12.6	25.71	17.8	12.8	33.96	2.9	12.3	36.42	6.8	12.3	65.31	32.6
13.6	26.31	18.2	13.8	34.53	2.8	13.3	35.96	6.9	13.3	63.90	32.8
14.6	26.85	18.6	14.8	35.07	2.7	14.3	35.49	6.9	14.3	62.46	33.0
15.6	27.33	19.0	15.8	35.61	2.6	15.3	35.05	6.9	15.3	61.06	33.2
16.6	27.75	19.3	16.8	36.11	2.5	16.3	34.61	7.0	16.3	59.67	33.3
17.6	28.18	19.7	17.8	36.60	2.4	17.3	34.18	7.0	17.3	58.34	33.4
18.6	28.60	20.0	18.8	37.07	2.3	18.3	33.78	7.0	18.3	57.06	33.6
19.6	29.05	20.3	19.8	37.54	2.2	19.3	33.39	7.0	19.3	55.83	33.7
20.6	29.56	20.6	20.8	37.99	2.1	20.3	32.99	7.0	20.3	54.62	33.8
21.5	30.08	21.0	21.8	38.47	2.0	21.3	32.59	7.1	21.3	53.40	34.0
22.5	30.64	21.3	22.8	38.96	1.9	22.2	32.17	7.1	22.3	52.14	34.2
23.5	31.21	21.7	23.8	39.47	1.7	23.2	31.74	7.2	23.3	50.84	34.4
24.5	31.76	22.0	24.8	40.02	1.6	24.2	31.29	7.2	24.3	49.47	34.5
25.5	32.28	22.4	25.8	40.58	1.5	25.2	30.83	7.2	25.3	48.04	34.7
26.5	32.73	22.8	26.8	41.15	1.4	26.2	30.37	7.3	26.3	46.57	34.9
27.5	33.12	23.2	27.8	41.71	1.4	27.2	29.90	7.2	27.3	45.07	35.0
28.5	33.44	23.6	28.8	42.26	1.3	28.2	29.46	7.2	28.3	43.57	35.1
29.5	33.68	24.0	29.8	42.80	1.3	29.2	29.02	7.2	29.3	42.10	35.2
30.5	33.91	24.4	30.8	43.31	1.2	30.2	28.59	7.1	30.3	40.69	35.2
31.5	34.13	24.7	31.7	43.79	1.2	31.2	28.19	7.0	31.3	39.33	35.3

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "
	1 23	+88 46		6 53	+87 12		18 4	+86 37		19 21	+88 59
	"	"		"	"		"	"		"	"
1.5	34.13	24.7	1.7	43.79	1.2	1.2	28.19	7.0	1.3	99.33	35.3
2.5	34.36	25.0	2.7	44.27	1.2	2.2	27.79	7.0	2.3	98.01	35.4
3.5	34.64	25.4	3.7	44.73	1.1	3.2	27.41	6.9	3.3	96.73	35.4
4.5	34.94	25.7	4.7	45.21	1.1	4.2	27.03	6.9	4.3	95.46	35.5
5.5	35.28	26.0	5.7	45.69	1.0	5.2	26.63	6.9	5.3	94.17	35.6
6.5	35.64	26.4	6.7	46.21	1.0	6.2	26.22	6.9	6.3	92.85	35.7
7.5	36.01	26.8	7.7	46.75	0.9	7.2	25.78	6.9	7.3	91.46	35.8
8.5	36.35	27.2	8.7	47.30	0.8	8.2	25.33	6.9	8.3	89.99	36.0
9.5	36.66	27.6	9.7	47.89	0.8	9.2	24.87	6.8	9.3	88.47	36.1
10.5	36.90	28.0	10.7	48.49	0.8	10.2	24.42	6.8	10.3	86.91	36.1
11.5	37.06	28.4	11.7	49.07	0.8	11.2	23.96	6.7	11.3	85.33	36.2
12.5	37.17	28.8	12.7	49.64	0.8	12.2	23.52	6.6	12.3	83.76	36.2
13.5	37.22	29.2	13.7	50.18	0.8	13.2	23.08	6.4	13.3	82.22	36.3
14.5	37.25	29.6	14.7	50.71	0.9	14.2	22.68	6.3	14.3	80.74	36.3
15.5	37.27	30.0	15.7	51.21	0.9	15.2	22.27	6.2	15.3	79.31	36.3
16.5	37.32	30.3	16.7	51.69	1.0	16.2	21.88	6.1	16.2	77.94	36.3
17.5	37.39	30.7	17.7	52.17	1.0	17.2	21.51	6.0	17.2	76.61	36.3
18.5	37.51	31.0	18.7	52.67	1.0	18.2	21.14	5.9	18.2	75.28	36.3
19.5	37.65	31.4	19.7	53.15	1.0	19.2	20.75	5.8	19.2	73.95	36.3
20.5	37.81	31.8	20.7	53.67	1.0	20.2	20.36	5.7	20.2	72.59	36.4
21.5	37.96	32.1	21.7	54.22	1.0	21.2	19.96	5.6	21.2	71.17	36.4
22.5	38.08	32.5	22.7	54.77	1.0	22.2	19.54	5.5	22.2	69.70	36.5
23.5	38.14	32.9	23.7	55.33	1.0	23.2	19.11	5.4	23.2	68.17	36.5
24.5	38.12	33.3	24.7	55.90	1.1	24.2	18.69	5.3	24.2	66.64	36.5
25.5	38.05	33.7	25.7	56.46	1.2	25.2	18.29	5.1	25.2	65.09	36.4
26.5	37.90	34.1	26.7	56.99	1.3	26.2	17.88	4.9	26.2	63.57	36.4
27.5	37.71	34.5	27.7	57.49	1.4	27.2	17.49	4.7	27.2	62.11	36.3
28.4	37.50	34.9	28.7	57.98	1.5	28.1	17.12	4.5	28.2	60.72	36.3
29.4	37.29	35.2	29.7	58.43	1.6	29.1	16.78	4.3	29.2	59.37	36.2
30.4	37.10	35.6	30.7	58.86	1.7	30.1	16.45	4.1	30.2	58.08	36.1
31.4	36.96	35.9	31.7	59.31	1.8	31.1	16.12	4.0	31.2	56.83	36.1
32.4	36.86	36.2	32.7	59.76	1.9	32.1	15.79	3.8	32.2	55.58	36.0

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Nov.	<sup>h</sup> 1 23	<sup>m</sup> +88 46	Nov.	<sup>h</sup> 6 53	<sup>m</sup> +87 12	Nov.	<sup>h</sup> 18 4	<sup>m</sup> +86 36	Nov.	<sup>h</sup> 19 21	<sup>m</sup> +88 59
	<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>
1.4	36.86	36.2	1.7	59.76	1.9	1.1	15.79	63.8	1.2	55.58	36.0
2.4	36.78	36.6	2.7	60.23	1.9	2.1	15.44	63.7	2.2	54.31	36.0
3.4	36.71	36.9	3.7	60.72	2.0	3.1	15.09	63.5	3.2	53.00	36.0
4.4	36.63	37.3	4.7	61.24	2.1	4.1	14.70	63.4	4.2	51.62	35.9
5.4	36.52	37.7	5.7	61.78	2.2	5.1	14.33	63.2	5.2	50.17	35.9
6.4	36.34	38.1	6.6	62.32	2.3	6.1	13.94	63.0	6.2	48.69	35.8
7.4	36.11	38.5	7.6	62.86	2.4	7.1	13.56	62.8	7.2	47.20	35.8
8.4	35.78	38.8	8.6	63.39	2.6	8.1	13.19	62.6	8.2	45.70	35.7
9.4	35.43	39.2	9.6	63.89	2.7	9.1	12.84	62.3	9.2	44.24	35.6
10.4	35.03	39.6	10.6	64.35	2.9	10.1	12.49	62.1	10.2	42.84	35.4
11.4	34.61	39.9	11.6	64.79	3.1	11.1	12.19	61.8	11.2	41.51	35.3
12.4	34.20	40.3	12.6	65.21	3.2	12.1	11.88	61.6	12.2	40.26	35.1
13.4	33.82	40.6	13.6	65.63	3.4	13.1	11.59	61.4	13.2	39.04	35.0
14.4	33.49	40.9	14.6	66.03	3.6	14.1	11.32	61.1	14.2	37.87	34.9
15.4	33.18	41.2	15.6	66.45	3.7	15.1	11.03	60.9	15.2	36.69	34.8
16.4	32.89	41.5	16.6	66.87	3.8	16.1	10.75	60.7	16.2	35.49	34.7
17.4	32.60	41.8	17.6	67.31	3.9	17.1	10.44	60.5	17.2	34.28	34.5
18.4	32.30	42.2	18.6	67.79	4.0	18.1	10.13	60.3	18.2	33.01	34.4
19.4	31.95	42.5	19.6	68.26	4.2	19.1	9.81	60.1	19.2	31.70	34.3
20.4	31.54	42.9	20.6	68.73	4.4	20.1	9.49	59.8	20.1	30.37	34.2
21.4	31.05	43.2	21.6	69.19	4.6	21.1	9.19	59.6	21.1	29.05	34.0
22.4	30.49	43.6	22.6	69.64	4.8	22.1	8.90	59.3	22.1	27.74	33.9
23.4	29.88	43.9	23.6	70.04	5.1	23.1	8.63	59.0	23.1	26.48	33.7
24.4	29.24	44.2	24.6	70.43	5.3	24.1	8.39	58.7	24.1	25.30	33.5
25.4	28.59	44.5	25.6	70.79	5.5	25.1	8.15	58.3	25.1	24.19	33.2
26.4	27.96	44.8	26.6	71.13	5.8	26.1	7.94	58.0	26.1	23.15	33.0
27.4	27.37	45.0	27.6	71.44	6.0	27.1	7.74	57.8	27.1	22.14	32.8
28.4	26.83	45.3	28.6	71.77	6.2	28.1	7.55	57.5	28.1	21.18	32.6
29.4	26.31	45.6	29.6	72.09	6.4	29.1	7.34	57.2	29.1	20.21	32.5
30.4	25.82	45.8	30.6	72.45	6.6	30.1	7.12	57.0	30.1	19.21	32.3
31.4	25.33	46.1	31.6	72.82	6.8	31.1	6.90	56.8	31.1	18.16	32.1

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '
	1 23	+88 46		6 54	+87 12		18 4	+86 36		19 20	+88 59
	s	"		s	"		s	"		s	"
1.4	25.33	46.1	1.6	12.82	6.8	1.1	6.90	56.8	1.1	78.16	32.1
2.4	24.80	46.4	2.6	13.22	7.0	2.1	6.66	56.5	2.1	77.07	32.0
3.3	24.23	46.7	3.6	13.63	7.2	3.1	6.42	56.2	3.1	75.94	31.8
4.3	23.61	47.0	4.6	14.04	7.4	4.0	6.18	55.9	4.1	74.78	31.6
5.3	22.90	47.3	5.6	14.43	7.7	5.0	5.96	55.6	5.1	73.63	31.4
6.3	22.15	47.6	6.6	14.80	7.9	6.0	5.74	55.3	6.1	72.50	31.1
7.3	21.35	47.9	7.6	15.12	8.2	7.0	5.56	54.9	7.1	71.45	30.8
8.3	20.52	48.2	8.6	15.42	8.5	8.0	5.38	54.6	8.1	70.47	30.6
9.3	19.71	48.4	9.6	15.70	8.8	9.0	5.24	54.2	9.1	69.57	30.3
10.3	18.92	48.6	10.6	15.96	9.1	10.0	5.11	53.9	10.1	68.72	30.0
11.3	18.17	48.8	11.6	16.20	9.3	11.0	4.97	53.6	11.1	67.94	29.8
12.3	17.47	49.0	12.5	16.46	9.6	12.0	4.87	53.3	12.1	67.19	29.5
13.3	16.79	49.2	13.5	16.71	9.8	13.0	4.74	53.0	13.1	66.44	29.3
14.3	16.12	49.4	14.5	16.99	10.0	14.0	4.61	52.7	14.1	65.65	29.1
15.3	15.45	49.6	15.5	17.28	10.3	15.0	4.47	52.4	15.1	64.85	28.9
16.3	14.75	49.9	16.5	17.57	10.5	16.0	4.33	52.1	16.1	63.99	28.6
17.3	14.00	50.1	17.5	17.86	10.8	17.0	4.18	51.8	17.1	63.13	28.4
18.3	13.16	50.3	18.5	18.15	11.1	18.0	4.04	51.5	18.1	62.27	28.1
19.3	12.29	50.6	19.5	18.42	11.4	19.0	3.91	51.1	19.1	61.42	27.9
20.3	11.34	50.8	20.5	18.65	11.7	20.0	3.80	50.8	20.1	60.62	27.6
21.3	10.37	51.0	21.5	18.85	12.0	21.0	3.74	50.4	21.1	59.89	27.2
22.3	9.39	51.1	22.5	19.01	12.4	22.0	3.68	50.0	22.1	59.27	26.9
23.3	8.42	51.2	23.5	19.16	12.7	23.0	3.63	49.7	23.1	58.71	26.6
24.3	7.48	51.4	24.5	19.29	13.0	24.0	3.61	49.3	24.1	58.21	26.3
25.3	6.59	51.5	25.5	19.41	13.3	25.0	3.59	49.0	25.1	57.75	26.0
26.3	5.75	51.6	26.5	19.55	13.6	26.0	3.58	48.7	26.0	57.32	25.7
27.3	4.94	51.7	27.5	19.68	13.8	27.0	3.55	48.4	27.0	56.87	25.4
28.3	4.15	51.9	28.5	19.83	14.1	28.0	3.53	48.1	28.0	56.38	25.2
29.3	3.35	52.0	29.5	20.01	14.4	29.0	3.49	47.8	29.0	55.87	24.9
30.3	2.52	52.2	30.5	20.20	14.6	30.0	3.43	47.5	30.0	55.31	24.7
31.3	1.63	52.3	31.5	20.40	14.9	31.0	3.39	47.2	31.0	54.73	24.4
32.3	0.70	52.5	32.5	20.58	15.3	32.0	3.35	46.8	32.0	54.14	24.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Andromedæ.		$\gamma$ Pegasi. (Algenib.)		$\beta$ Hydri.		$\iota^2$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 0 3	° ' +28 31	h m 0 8	° ' +14 37	h m 0 20	° ' -77 48	h m 0 24	° ' - 4 30
	s	"	s	"	s	"	s	"
(Dec. 30.2)	10.77 -14	73.4 -0.8	2.93 -12	30.0 -0.7	27.32 -95	96.5 +0.7	54.04 -11	51.0 -0.7
Jan. 9.2	10.63 .13	72.5 1.0	2.82 .11	29.2 0.9	26.40 .89	95.5 1.3	53.93 .11	51.6 0.6
19.2	10.50 .18	71.4 1.3	2.71 .10	28.3 1.0	25.53 .82	93.9 1.9	53.83 .10	52.2 0.5
29.2	10.39 .12	70.0 1.5	2.61 .09	27.3 1.0	24.74 .73	91.7 2.4	53.73 .09	52.6 0.3
Feb. 8.1	10.29 .09	68.4 1.6	2.53 .07	26.2 1.0	24.06 .62	89.1 2.8	53.64 .08	52.8 -0.2
18.1	10.22 -06	66.8 -1.6	2.47 -05	25.2 -1.0	23.49 -50	86.0 +3.2	53.57 -06	52.9 0.0
28.1	10.18 -02	65.2 1.6	2.44 -02	24.3 0.9	23.06 .36	82.7 3.5	53.52 -03	52.8 +0.2
Mar. 10.0	10.17 +02	63.7 1.5	2.44 +01	23.5 0.7	22.77 .21	79.0 3.7	53.51 .00	52.5 0.4
20.0	10.21 .06	62.3 1.3	2.47 .05	22.8 0.5	22.63 -06	75.3 3.8	53.52 +03	52.0 0.6
30.0	10.29 .10	61.1 1.1	2.54 .09	22.4 -0.3	22.65 +10	71.4 3.8	53.57 .07	51.2 0.9
Apr. 9.0	10.42 +15	60.1 -0.8	2.65 +13	22.3 0.0	22.83 +25	67.6 +3.8	53.66 +11	50.2 +1.1
18.9	10.59 .19	59.5 -0.4	2.80 .17	22.5 +0.3	23.16 .41	63.8 3.7	53.79 .15	49.0 1.4
28.9	10.80 .24	59.3 0.0	3.00 .21	23.0 0.6	23.64 .55	60.3 3.5	53.96 .19	47.5 1.6
May 8.9	11.06 .27	59.5 +0.4	3.23 .25	23.8 1.0	24.26 .69	56.9 3.2	54.17 .23	45.8 1.7
18.8	11.35 .30	60.0 0.7	3.49 .28	24.9 1.3	25.02 .81	53.9 2.8	54.41 .26	44.0 1.9
June 28.8	11.67 +33	61.0 +1.1	3.78 +30	26.3 +1.5	25.88 +91	51.3 +2.4	54.68 +28	42.1 +2.0
7.8	12.00 .34	62.3 1.5	4.09 .32	27.9 1.7	26.83 .98	49.1 1.9	54.97 .30	40.0 2.1
17.8	12.35 .35	63.9 1.8	4.42 .32	29.8 1.9	27.86 1.04	47.4 1.4	55.28 .31	38.0 2.1
27.8	12.70 .34	65.8 2.0	4.74 .32	31.8 2.1	28.93 1.06	46.3 0.9	55.60 .31	35.9 2.0
July 7.7	13.04 .33	68.0 2.2	5.06 .31	33.9 2.1	30.00 1.06	45.7 +0.3	55.91 .31	33.9 1.9
17.7	13.36 +31	70.3 +2.4	5.36 +29	36.0 +2.2	31.06 +1.03	45.6 -0.3	56.21 +29	32.1 +1.8
27.7	13.66 .28	72.7 2.5	5.65 .27	38.2 2.1	32.08 .97	46.2 0.9	56.50 .27	30.4 1.6
Aug. 6.6	13.93 .25	75.2 2.5	5.90 .24	40.3 2.1	33.02 .87	47.3 1.4	56.76 .25	28.9 1.3
16.6	14.16 .21	77.7 2.5	6.13 .21	42.3 1.9	33.84 .75	48.9 1.9	56.99 .22	27.7 1.1
26.6	14.35 .17	80.2 2.4	6.32 .17	44.2 1.8	34.53 .61	51.0 2.3	57.19 .18	26.7 0.8
Sept. 5.5	14.51 +13	82.6 +2.3	6.47 +13	45.9 +1.6	35.07 +.45	53.5 -2.6	57.36 +14	26.1 +1.5
15.5	14.62 .09	84.8 2.2	6.58 .09	47.4 1.4	35.43 .27	56.3 2.9	57.48 .11	25.7 +0.3
25.5	14.69 .05	86.9 2.0	6.65 .06	48.7 1.2	35.60 +.08	59.3 3.0	57.57 .07	25.5 0.0
Oct. 5.5	14.73 +02	88.8 1.7	6.69 +02	49.7 0.9	35.59 -11	62.4 3.1	57.63 +04	25.6 -0.2
15.4	14.73 -02	90.4 1.5	6.70 -01	50.6 0.7	35.39 .29	65.4 3.0	57.65 .00	26.0 0.4
25.4	14.69 -05	91.7 +1.2	6.67 -04	51.2 +0.5	35.00 -46	68.3 -2.8	57.64 -03	26.5 -0.6
Nov. 4.4	14.63 .07	92.8 1.0	6.62 .06	51.6 0.3	34.46 .61	70.9 2.4	57.60 .05	27.1 0.7
14.4	14.55 .09	93.6 0.7	6.55 .08	51.7 +0.1	33.77 .73	73.2 2.0	57.54 .07	27.8 0.8
24.4	14.45 .11	94.1 +0.3	6.47 .09	51.7 -0.1	32.97 .83	74.9 1.5	57.46 .08	28.6 0.8
Dec. 4.3	14.33 .12	94.3 0.0	6.37 .10	51.4 0.3	32.08 .90	76.2 0.9	57.37 .10	29.4 0.8
14.3	14.19 -13	94.2 -0.3	6.26 -11	51.0 -0.5	31.14 -94	76.8 -0.3	57.27 -11	30.2 -0.8
24.3	14.06 .14	93.7 0.6	6.14 .12	50.4 0.7	30.18 .94	76.8 +0.3	57.16 .11	31.0 0.7
34.2	13.92 -14	93.0 -0.9	6.03 -12	49.6 -0.8	29.23 -95	76.2 +0.9	57.05 -11	31.7 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Cassiopeiæ.		$\beta$ Ceti.		$\gamma$ Cassiopeiæ.		$\epsilon$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 0 34	+55 58	h m 0 38	-18 31	h m 0 38	+74 26	h m 0 57	+ 7 20
	"	"	"	"	"	"	"	"
(Dec. 30.2)	47.52 -27	83.2 -0.1	32.30 -12	88.7 -0.6	59.24 -68	36.0 +0.3	43.23 -11	55.1 -0.7
Jan. 9.2	47.24 .27	82.8 0.6	32.17 .12	89.2 0.4	58.55 .69	36.0 -0.3	43.12 .11	54.4 0.7
19.2	46.97 .27	81.9 1.1	32.05 .12	89.5 -0.1	57.86 .67	35.5 0.9	43.02 .12	53.7 0.7
29.2	46.71 .25	80.6 1.6	31.94 .11	89.4 +0.2	57.21 .63	34.3 1.5	42.89 .11	53.0 0.7
Feb. 8.1	46.47 .22	78.8 2.0	31.83 .10	89.2 0.4	56.61 .56	32.5 2.0	42.78 .10	52.3 0.6
18.1	46.27 -18	76.7 -2.2	31.74 -08	88.6 +0.7	56.09 -46	30.3 -4.4	42.68 -09	51.7 -0.5
28.1	46.12 .12	74.3 2.4	31.68 .05	87.8 1.0	55.69 .34	27.8 2.7	42.61 .06	51.2 0.4
Mar. 10.1	46.02 -06	71.8 2.5	31.64 -02	86.7 1.2	55.42 .21	25.0 2.9	42.56 -03	50.9 0.3
20.1	45.99 +01	69.2 2.5	31.64 +01	85.3 1.5	55.28 -06	22.0 3.0	42.54 .00	50.7 -0.1
30.1	46.04 .08	66.7 2.4	31.67 .05	83.8 1.7	55.30 +10	19.0 2.9	42.56 +04	50.7 +0.1
Apr. 9.0	46.16 +16	64.4 -2.2	31.74 +09	81.9 +1.9	55.48 +25	16.1 -2.8	42.62 +08	50.9 +0.4
19.0	46.35 .23	62.4 1.9	31.86 .14	79.9 2.1	55.81 .40	13.4 2.5	42.72 .12	51.4 0.6
29.0	46.62 .30	60.7 1.5	32.01 .18	77.8 2.2	56.28 .53	11.1 2.2	42.87 .17	52.2 0.9
May 8.9	46.95 .36	59.4 1.1	32.21 .22	75.5 2.3	56.88 .65	9.1 1.7	43.05 .22	53.2 1.2
18.9	47.34 .41	58.6 0.6	32.45 .25	73.1 2.4	57.59 .75	7.6 1.2	43.28 .24	54.5 1.4
28.9	47.77 +45	58.2 -0.1	32.71 +28	70.8 +2.4	58.39 +83	6.6 -0.7	43.54 +27	56.0 +1.6
June 7.8	48.23 .48	58.4 +0.4	33.00 .30	68.4 2.3	59.25 .88	6.1 -0.2	43.82 .29	57.6 1.8
17.8	48.72 .49	59.0 0.9	33.31 .31	66.2 2.2	60.15 .91	6.2 +0.4	44.12 .31	59.5 1.9
27.8	49.21 .49	60.2 1.4	33.64 .32	64.1 2.0	61.07 .92	6.9 0.9	44.44 .32	61.4 1.9
July 7.8	49.70 .48	61.8 1.8	33.96 .32	62.2 1.7	61.98 .90	8.0 1.4	44.76 .31	63.3 2.0
17.7	50.17 +46	63.7 +2.2	34.28 +31	60.6 +1.5	62.87 +86	9.7 +1.9	45.07 +30	65.3 +1.9
27.7	50.62 .43	66.1 2.5	34.58 .29	59.2 1.2	63.70 .80	11.8 2.3	45.37 .29	67.2 1.8
Aug. 6.7	51.03 .39	68.7 2.8	34.86 .27	58.2 0.9	64.47 .73	14.3 2.7	45.65 .27	69.0 1.7
16.6	51.39 .34	71.6 3.0	35.11 .24	57.6 0.5	65.15 .64	17.2 3.0	45.90 .24	70.7 1.6
26.6	51.71 .29	74.7 3.1	35.32 .20	57.3 +0.1	65.74 .54	20.4 3.3	46.13 .21	72.1 1.4
Sept. 5.6	51.97 +23	77.9 +3.2	35.50 +16	57.3 -0.2	66.23 +43	23.8 +3.5	46.32 +18	73.4 +1.2
15.6	52.17 .17	81.1 3.2	35.65 .12	57.7 0.5	66.61 .32	27.4 3.6	46.48 .14	74.4 0.9
25.6	52.32 .12	84.3 3.2	35.75 .08	58.4 0.8	66.87 .20	31.0 3.6	46.60 .11	75.3 0.7
Oct. 5.5	52.40 .06	87.4 3.1	35.81 .05	59.4 1.0	67.01 +08	34.7 3.6	46.69 .07	75.8 0.5
15.5	52.44 +01	90.4 2.9	35.84 +01	60.5 1.2	67.04 -03	38.3 3.5	46.75 .04	76.2 0.2
25.5	52.41 -05	93.2 +2.7	35.84 -02	61.8 -1.3	66.95 -15	41.7 +3.3	46.77 +01	76.4 +0.1
Nov. 4.4	52.34 .10	95.8 2.4	35.80 .05	63.1 1.4	66.74 .26	44.9 3.1	46.77 -01	76.4 -0.1
14.4	52.22 .14	98.0 2.1	35.74 .07	64.5 1.3	66.42 .37	47.8 2.7	46.74 .04	76.2 0.3
24.4	52.06 .18	99.8 1.6	35.66 .09	65.8 1.3	66.00 .46	50.4 2.3	46.69 .06	75.8 0.4
Dec. 4.3	51.86 .22	101.2 1.2	35.56 .11	67.0 1.2	65.49 .55	52.4 1.8	46.62 .08	75.4 0.5
14.3	51.63 -25	102.1 +0.7	35.45 -12	68.1 -1.0	64.91 -62	54.0 +1.3	46.54 -09	74.8 -0.6
24.3	51.37 .27	102.5 +0.2	35.32 .12	69.0 0.8	64.26 .66	55.0 0.7	46.44 .10	74.2 0.7
34.3	51.09 -29	102.4 -0.4	35.20 -13	69.7 -0.6	63.58 -69	55.4 +0.1	46.32 -12	73.5 +0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Andromedæ.		$\theta^1$ Ceti.		38 Cassiopeiæ.		$\eta$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m I 4	° ' +35 5	h m I 18	° ' - 8 41	h m I 23	° ' +69 44	h m I 26	° ' +14 49
(Dec. 30.3)	s	"	s	"	s	"	s	"
Jan. 9.2	5.86 -14	23.6 -0.2	59.77 -11	73.8 -0.8	44.58 -47	66.3 +0.8	6.06 -11	41.2 -0.5
19.2	5.71 .15	23.1 0.6	59.66 .11	74.5 0.7	44.10 .50	66.7 +0.2	5.94 .12	40.7 0.6
29.2	5.55 .16	22.4 0.9	59.53 .12	75.1 0.5	43.59 .51	66.6 -0.4	5.82 .13	40.0 0.7
Feb. 8.1	5.39 .15	21.4 1.2	59.41 .12	75.5 0.3	43.08 .50	66.0 1.0	5.69 .13	39.2 0.8
18.1	5.24 .14	20.1 1.4	59.29 .12	75.7 -0.1	42.59 .47	64.7 1.5	5.57 .12	38.4 0.8
28.1	5.10 -12	18.6 -1.6	59.18 -10	75.6 +0.1	42.14 -42	63.0 -1.9	5.45 -11	37.6 -0.8
Mar. 10.1	4.99 .09	17.0 1.7	59.08 .08	75.4 0.3	41.75 .34	60.9 2.3	5.35 .09	36.8 0.7
20.1	4.92 .05	15.3 1.7	59.01 .06	74.9 0.6	41.45 .25	58.4 2.6	5.28 .06	36.1 0.7
30.0	4.88 -01	13.6 1.6	58.97 -02	74.2 0.8	41.25 .14	55.7 2.7	5.23 -03	35.5 0.5
Apr. 9.0	4.89 +04	12.1 1.5	58.97 +01	73.3 1.1	41.16 -03	52.9 2.8	5.22 +01	35.1 0.5
19.0	4.96 +09	10.7 -1.3	59.00 +05	72.1 +1.3	41.20 +09	50.1 -2.7	5.25 +06	34.9 -0.1
29.0	5.07 .14	9.5 1.0	59.07 .10	70.7 1.5	41.35 .21	47.4 2.6	5.33 .10	34.9 +0.1
May 8.9	5.24 .19	8.7 0.7	59.19 .14	69.1 1.7	41.62 .33	44.9 2.3	5.46 .15	35.1 0.4
18.9	5.46 .24	8.2 -0.3	59.35 .18	67.2 1.9	42.01 .44	42.8 2.0	5.63 .19	35.6 0.6
28.9	5.72 .28	8.1 0.0	59.55 .22	65.3 2.0	42.50 .53	41.0 1.6	5.83 .23	36.4 0.9
June 7.8	6.02 +32	8.3 +0.4	59.79 +25	63.2 +2.1	43.07 +61	39.6 -1.1	6.08 +27	37.5 +1.2
17.8	6.36 .34	9.0 0.8	60.06 .28	61.1 2.1	43.72 .67	38.7 0.6	6.36 .30	38.8 1.4
27.8	6.71 .36	10.0 1.2	60.34 .30	58.9 2.1	44.42 .72	38.4 -0.1	6.66 .31	40.3 1.6
July 7.8	7.08 .37	11.3 1.5	60.65 .31	56.8 2.0	45.15 .74	38.5 +0.4	6.98 .32	41.9 1.7
17.7	7.45 .37	12.9 1.8	60.96 .31	54.8 1.9	45.90 .75	39.2 0.9	7.30 .32	43.7 1.8
27.7	7.81 +36	14.8 +2.0	61.27 +31	52.9 +1.7	46.65 +73	40.3 +1.4	7.62 +32	45.6 +1.9
Aug. 6.7	8.16 .34	16.8 2.2	61.57 .30	51.3 1.5	47.37 .71	41.9 1.8	7.93 .31	47.5 1.9
16.6	8.49 .31	19.1 2.3	61.86 .28	49.9 1.3	48.06 .67	44.0 2.2	8.23 .29	49.3 1.8
26.6	8.79 .28	21.5 2.4	62.13 .25	48.8 1.0	48.70 .61	46.4 2.6	8.51 .26	51.1 1.7
Sept. 5.6	9.05 .25	23.9 2.4	62.37 .22	48.0 0.7	49.28 .56	49.1 2.9	8.76 .24	52.8 1.6
15.6	9.28 +21	26.2 +2.4	62.58 +19	47.5 +0.3	49.80 +47	52.1 +3.1	8.98 +21	54.4 +1.4
25.5	9.47 .17	28.6 2.3	62.75 .16	47.3 0.0	50.23 .39	55.3 3.3	9.17 .17	55.7 1.3
Oct. 5.5	9.63 .13	30.9 2.2	62.89 .12	47.4 -0.3	50.58 .31	58.6 3.4	9.32 .14	56.9 1.1
15.5	9.74 .09	33.0 2.1	63.00 .09	47.8 0.5	50.85 .22	62.0 3.4	9.45 .11	57.9 0.9
25.5	9.81 .06	35.0 1.9	63.07 .06	48.4 0.7	51.02 .13	65.5 3.4	9.54 .07	58.7 0.7
Nov. 4.4	9.85 +02	36.8 +1.7	63.11 +05	49.3 -0.9	51.11 +04	68.8 +3.3	9.59 +04	59.2 +0.5
14.4	9.85 -01	38.4 1.5	63.12 .00	50.3 1.0	51.10 -05	72.0 3.1	9.62 +01	59.6 0.3
24.4	9.83 .04	39.7 1.2	63.10 -05	51.3 1.1	51.00 .14	75.0 2.8	9.62 -01	59.8 +0.1
Dec. 4.3	9.77 .07	40.7 0.9	63.06 .05	52.5 1.1	50.81 .23	77.7 2.5	9.60 .04	59.9 0.0
14.3	9.68 .10	41.5 0.6	63.00 .07	53.6 1.1	50.54 .31	80.0 2.1	9.55 .06	59.8 -0.2
24.3	9.57 -12	41.9 +0.3	62.91 -09	54.6 -1.0	50.19 -38	81.9 +1.6	9.47 -06	59.5 -0.3
34.3	9.44 .14	42.0 -0.1	62.81 .11	55.6 0.9	49.78 .44	83.2 1.1	9.38 .10	59.1 0.3
	9.29 -16	41.8 -0.4	62.70 -12	56.5 -0.8	49.32 -49	84.1 +0.6	9.27 -12	58.5 -0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Eridani. (Achernar.)		$\sigma$ Piscium.		$\beta$ Arietis.		$\gamma$ Cassiopeiæ.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m I 33	° ' " -57 44	h m I 40	° ' " + 8 39	h m I 49	° ' " +20 18	h m I 54	° ' " +71 55
	s	"	s	"	s	"	s	"
(Dec. 30.3)	58.29 -33	70.4 -0.7	5.03 -10	5.4 -0.6	5.11 -11	63.6 -0.4	51.10 -50	81.9 +1.2
Jan. 9.2	57.96 .34	70.8 -0.2	4.92 .11	4.8 0.6	5.00 .12	63.1 0.5	50.58 .54	82.8 +0.6
19.2	57.62 .34	70.7 +0.4	4.80 .12	4.1 0.7	4.87 .13	62.6 0.6	50.02 .58	83.1 0.0
29.2	57.29 .33	70.0 0.9	4.68 .13	3.5 0.7	4.73 .14	61.9 0.8	49.43 .58	82.9 -0.5
Feb. 8.2	56.97 .31	68.8 1.4	4.55 .12	2.8 0.6	4.59 .14	61.0 0.9	48.85 .57	82.1 1.1
18.1	56.67 -28	67.1 +1.9	4.43 -11	2.2 -0.5	4.46 -13	60.1 -0.9	48.30 -52	80.7 -1.6
28.1	56.41 .14	65.0 2.4	4.32 .09	1.7 0.5	4.34 .11	59.2 0.9	47.80 .45	78.9 2.0
Mar. 10.1	56.19 .29	62.4 2.7	4.24 .07	1.3 0.3	4.24 .08	58.3 0.9	47.39 .36	76.6 2.4
20.1	56.02 .14	59.5 3.0	4.18 -0.4	1.0 -0.2	4.17 .05	57.5 0.8	47.08 .25	74.1 2.6
30.0	55.90 .08	56.3 3.3	4.16 .00	0.9 0.0	4.14 -0.01	56.8 0.7	46.89 -13	71.4 2.8
Apr. 9.0	55.86 -01	53.0 +3.4	4.18 +0.4	1.1 +0.2	4.15 +0.3	56.2 -0.5	46.82 .00	68.6 -2.8
19.0	55.88 +06	49.5 3.5	4.24 .08	1.5 0.5	4.21 .08	55.8 -0.2	46.90 +1.4	65.8 2.7
29.0	55.97 .13	45.9 3.6	4.34 .13	2.0 0.7	4.31 .13	55.7 0.0	47.10 .27	63.1 2.5
May 8.9	56.13 .20	42.3 3.5	4.49 .17	2.9 1.0	4.47 .17	55.8 +0.3	47.44 .40	60.7 2.3
18.9	56.36 .26	38.9 3.4	4.69 .21	4.0 1.2	4.66 .22	56.2 0.5	47.91 .52	58.6 1.9
June 28.9	56.65 +32	35.6 +3.2	4.92 +25	5.2 +1.4	4.90 +25	56.9 +0.8	48.48 +62	56.9 -1.5
7.8	57.00 .37	32.5 2.9	5.18 .28	6.7 1.6	5.17 .28	57.8 1.0	49.14 .70	55.6 1.1
17.8	57.40 .41	29.8 2.5	5.47 .30	8.4 1.7	5.47 .31	59.0 1.3	49.88 .76	54.7 0.6
27.8	57.83 .45	27.5 2.1	5.77 .31	10.1 1.8	5.79 .32	60.4 1.5	50.67 .80	54.4 -0.1
July 7.8	58.29 .46	25.7 1.6	6.08 .31	12.0 1.8	6.12 .33	62.0 1.6	51.48 .82	54.6 +0.4
17.7	58.76 +47	24.4 +1.1	6.40 +31	13.8 +1.8	6.45 +33	63.7 +1.7	52.31 +83	55.3 +0.9
27.7	59.23 .46	23.6 +0.5	6.71 .30	15.6 1.8	6.77 .32	65.4 1.8	53.14 .81	56.4 1.4
Aug. 6.7	59.68 .44	23.3 -0.1	7.01 .29	17.3 1.7	7.09 .30	67.2 1.8	53.95 .78	58.0 1.8
16.6	60.11 .41	23.7 0.6	7.29 .27	18.9 1.5	7.38 .28	69.0 1.8	54.71 .74	60.0 2.2
26.6	60.50 .37	24.6 1.2	7.54 .24	20.4 1.3	7.66 .26	70.8 1.7	55.42 .68	62.3 2.5
Sept. 5.6	60.84 +31	26.0 -1.7	7.77 +21	21.6 +1.1	7.90 +23	72.5 +1.6	56.06 +61	65.0 +2.8
15.6	61.13 .25	28.0 2.1	7.96 .18	22.7 0.9	8.11 .20	74.0 1.5	56.63 .53	68.0 3.1
25.5	61.34 .18	30.3 2.5	8.13 .15	23.5 0.7	8.30 .17	75.4 1.3	57.11 .44	71.2 3.2
Oct. 5.5	61.49 .11	32.9 2.8	8.26 .12	24.1 0.5	8.45 .13	76.6 1.1	57.51 .34	74.4 3.3
15.5	61.57 +05	35.8 2.9	8.36 .09	24.5 0.3	8.56 .10	77.7 1.0	57.81 .25	77.8 3.4
Nov. 25.5	61.59 -02	38.8 -3.0	8.43 +06	24.7 +0.1	8.65 +07	78.5 +0.8	58.00 +1.4	81.2 +3.3
4.4	61.53 .09	41.7 2.9	8.47 +03	24.6 -0.1	8.70 .04	79.2 0.6	58.09 +0.4	84.5 3.2
14.4	61.41 .15	44.6 2.7	8.49 .00	24.5 0.2	8.73 +01	79.8 0.4	58.08 -0.7	87.6 3.0
24.4	61.23 .20	47.2 2.4	8.47 -03	24.2 0.4	8.73 -01	80.1 0.2	57.95 .18	90.5 2.8
Dec. 4.3	61.00 .25	49.5 2.1	8.43 .05	23.8 0.5	8.69 .05	80.3 +0.1	57.72 .28	93.1 2.4
14.3	60.73 -29	51.3 -1.6	8.37 -07	23.3 -0.5	8.63 -07	80.2 -0.1	57.40 -37	95.4 +2.0
24.3	60.43 .31	52.7 1.1	8.29 .09	22.7 0.6	8.55 .09	80.0 0.3	56.99 .45	97.2 1.5
34.3	60.10 -34	53.5 -0.6	8.18 -11	22.1 -0.7	8.44 -12	89.7 -0.4	56.50 -31	98.4 +1.0



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Arietis.		$\zeta^1$ Ceti.		$\epsilon$ Cassiopeiae.		$\zeta^2$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 2 I	° +22 59	h m 2 7	° + 8 22	h m 2 20	° +66 56	h m 2 22	° + 8 0
(Dec. 30.3)	30.38 -10	18.1 -0.2	40.39 -09	30.2 -0.6	47.09 -34	76.4 +1.3	49.01 -09	33.6 -0.7
Jan. 9.3	30.27 -12	17.7 0.4	40.29 -11	29.5 0.6	46.72 -39	77.4 0.8	48.92 -10	33.0 0.6
19.2	30.14 -14	17.2 0.6	40.17 -12	28.9 0.6	46.32 -42	78.0 +0.3	48.80 -12	32.3 0.6
29.2	30.00 -14	16.6 0.7	40.04 -13	28.3 0.6	45.88 -45	78.0 -0.3	48.67 -14	31.7 0.6
Feb. 8.2	29.85 -14	15.8 0.8	39.90 -14	27.7 0.6	45.42 -45	77.4 0.8	48.53 -14	31.2 0.5
18.2	29.70 -14	14.9 -0.9	39.77 -13	27.1 -0.5	44.98 -42	76.4 -1.3	48.39 -14	30.6 -0.5
28.2	29.57 -12	14.0 1.0	39.65 -12	26.7 0.4	44.57 -38	74.8 1.7	48.26 -12	30.2 0.4
Mar. 10.1	29.46 -10	13.0 1.0	39.54 -09	26.3 0.3	44.22 -32	72.9 2.1	48.14 -10	29.9 0.3
20.1	29.38 -06	12.0 0.9	39.46 -06	26.1 -0.1	43.93 -24	70.7 2.4	48.05 -08	29.7 -0.1
30.1	29.34 -02	11.2 0.8	39.41 -03	26.0 0.0	43.73 -15	68.2 2.6	47.99 -04	29.6 0.0
Apr. 9.1	29.34 +02	10.5 -0.6	39.40 +02	26.1 +0.2	43.63 -04	65.5 -2.6	47.97 -00	29.7 +0.2
19.0	29.38 -07	9.9 0.4	39.44 -06	26.4 0.4	43.64 +07	62.9 2.6	47.99 +04	30.0 0.4
29.0	29.48 -12	9.6 -0.2	39.52 -10	27.0 0.7	43.76 -17	60.4 2.5	48.05 -09	30.6 0.6
May 9.0	29.62 -17	9.5 +0.1	39.64 -15	27.8 0.9	43.99 -28	58.0 2.2	48.16 -13	31.3 0.9
18.9	29.81 -21	9.7 0.3	39.81 -19	28.9 1.1	44.32 -38	55.9 1.9	48.32 -18	32.3 1.1
28.9	30.04 +23	10.2 +0.6	40.02 +23	30.0 +1.3	44.74 +46	54.1 -1.6	48.51 +21	33.5 +1.3
June 7.9	30.31 -28	10.9 0.9	40.26 -26	31.4 1.5	45.25 -34	52.7 1.2	48.74 -25	34.9 1.4
17.9	30.61 -31	12.0 1.1	40.54 -28	33.0 1.6	45.82 -60	51.8 0.7	49.01 -27	36.4 1.6
27.8	30.93 -33	13.2 1.3	40.83 -30	34.7 1.7	46.44 -64	51.3 -0.3	49.29 -29	38.0 1.7
July 7.8	31.26 -33	14.6 1.5	41.14 -31	36.3 1.7	47.10 -67	51.2 +0.2	49.60 -31	39.7 1.7
17.8	31.59 +33	16.2 +1.6	41.45 +31	38.1 +1.7	47.78 +68	51.6 +0.7	49.91 +31	41.4 +1.7
27.7	31.93 -33	17.9 1.7	41.76 -31	39.8 1.7	48.46 -68	52.5 1.1	50.22 -31	43.1 1.6
Aug. 6.7	32.25 -31	19.6 1.8	42.07 -30	41.5 1.6	49.14 -66	53.8 1.5	50.53 -30	44.7 1.5
16.7	32.56 -29	21.4 1.8	42.36 -28	43.0 1.4	49.79 -63	55.5 1.9	50.82 -28	46.2 1.4
26.7	32.84 -27	23.2 1.7	42.63 -26	44.3 1.3	50.41 -59	57.5 2.2	51.10 -26	47.5 1.2
Sept. 5.6	33.10 +24	24.8 +1.6	42.87 +23	45.5 +1.1	50.98 +54	59.9 +2.5	51.35 +24	48.6 +1.0
15.6	33.33 -21	26.4 1.5	43.09 -20	46.5 0.9	51.49 -49	62.5 2.7	51.58 -22	49.5 0.8
25.6	33.53 -18	27.9 1.4	43.28 -17	47.2 0.6	51.95 -42	65.4 2.9	51.78 -19	50.2 0.6
Oct. 5.6	33.69 -15	29.2 1.2	43.44 -14	47.7 0.4	52.34 -35	68.4 3.0	51.95 -16	50.6 0.3
15.5	33.83 -12	30.4 1.1	43.57 -11	48.1 +0.2	52.65 -27	71.4 3.1	52.10 -13	50.9 +0.1
25.5	33.93 +09	31.4 +0.9	43.66 +08	48.2 0.0	52.89 +20	74.6 +3.1	52.21 +10	50.9 0.0
Nov. 4.5	34.00 -05	32.2 0.8	43.73 -05	48.1 -0.1	53.04 -11	77.7 3.0	52.30 -07	50.8 -0.2
14.4	34.04 +02	32.9 0.6	43.77 +02	47.9 0.3	53.12 +03	80.7 2.9	52.35 -04	50.6 0.3
24.4	34.04 -01	33.4 0.4	43.78 -00	47.5 0.4	53.10 -05	83.5 2.7	52.37 +01	50.2 0.4
Dec. 4.4	34.02 -04	33.7 +0.2	43.76 -02	47.1 0.5	53.00 -14	86.0 2.4	52.37 -02	49.7 0.3
14.4	33.97 -07	33.8 0.0	43.72 -06	46.5 -0.6	52.82 -22	88.2 +2.0	52.33 -05	49.1 -0.6
24.3	33.89 -09	33.8 -0.1	43.65 -08	45.9 0.6	52.56 -30	90.1 1.6	52.27 -07	48.5 0.6
34.3	33.79 -11	33.5 -0.3	43.56 -10	45.3 -0.7	52.23 -37	91.4 +1.1	52.19 -10	47.8 -0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Ceti.		$\alpha$ Ceti.		48 Cephei (H.)		$\zeta$ Arietia.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	$\begin{smallmatrix} h & m \\ 2 & 38 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ + & 2 \ 48 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 2 & 57 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ + & 3 \ 41 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 3 & 7 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ + & 77 \ 21 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 3 & 9 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ + & 20 \ 40 \end{smallmatrix}$
	$\begin{smallmatrix} s \\ 2 \end{smallmatrix}$	$\begin{smallmatrix} s \\ + \end{smallmatrix}$	$\begin{smallmatrix} s \\ 2 \end{smallmatrix}$	$\begin{smallmatrix} s \\ + \end{smallmatrix}$	$\begin{smallmatrix} s \\ 3 \end{smallmatrix}$	$\begin{smallmatrix} s \\ + \end{smallmatrix}$	$\begin{smallmatrix} s \\ 3 \end{smallmatrix}$	$\begin{smallmatrix} s \\ + \end{smallmatrix}$
(Dec. 30.3)	5.73 $-.09$	41.9 $-0.8$	1.79 $-.07$	41.8 $-0.8$	35.74 $-.53$	70.0 $+1.1$	7.75 $-.07$	22.2 $-0.1$
Jan. 9.3	5.64 $.10$	41.2 $-0.7$	1.71 $.10$	41.0 $-0.7$	35.13 $.66$	71.8 $1.6$	7.68 $.09$	22.0 $-0.8$
19.2	5.53 $.13$	40.5 $-0.7$	1.60 $.12$	40.3 $-0.7$	34.41 $.76$	73.2 $1.1$	7.57 $.12$	21.7 $-0.3$
29.2	5.40 $.14$	39.8 $-0.5$	1.47 $.13$	39.7 $-0.6$	33.59 $.83$	74.0 $+0.5$	7.43 $.14$	21.3 $-0.4$
Feb. 8.2	5.25 $.14$	39.3 $-0.5$	1.33 $.14$	39.2 $-0.5$	32.73 $.86$	74.2 $-0.1$	7.28 $.16$	20.8 $-0.5$
18.2	5.11 $.14$	38.9 $-0.4$	1.18 $.13$	38.7 $-0.4$	31.85 $.86$	73.8 $-0.7$	7.12 $.16$	20.2 $-0.6$
28.2	4.97 $.13$	38.6 $-0.2$	1.03 $.13$	38.4 $-0.2$	30.99 $.81$	72.9 $1.2$	6.96 $.16$	19.6 $-0.6$
Mar. 10.1	4.84 $.12$	38.4 $-0.1$	0.89 $.13$	38.2 $-0.1$	30.20 $.73$	71.4 $1.7$	6.81 $.14$	18.9 $-0.7$
20.1	4.74 $.09$	38.4 $+0.1$	0.77 $.10$	38.2 $-0.0$	29.51 $.62$	69.4 $2.1$	6.68 $.12$	18.3 $-0.6$
30.1	4.66 $.06$	38.6 $-0.3$	0.69 $.07$	38.3 $+0.8$	28.95 $.47$	67.1 $2.5$	6.58 $.08$	17.7 $-0.6$
Apr. 9.1	4.62 $-.02$	39.0 $+0.5$	0.63 $-.03$	38.6 $+0.4$	28.56 $-.30$	64.5 $-2.7$	6.51 $-.04$	17.1 $-0.5$
19.0	4.62 $+0.02$	39.6 $-0.7$	0.61 $+0.01$	39.2 $-0.6$	28.34 $-.13$	61.7 $2.8$	6.49 $.00$	16.7 $-0.4$
29.0	4.67 $.07$	40.4 $-0.9$	0.64 $.03$	39.9 $-0.8$	28.31 $+0.07$	58.8 $2.8$	6.51 $+0.03$	16.4 $-0.8$
May 9.0	4.76 $.11$	41.5 $1.1$	0.72 $.10$	40.8 $1.0$	28.47 $.86$	56.0 $2.8$	6.59 $.10$	16.3 $-0.8$
19.0	4.90 $.16$	42.7 $1.3$	0.83 $.14$	42.0 $1.2$	28.82 $.45$	53.3 $2.6$	6.71 $.13$	16.4 $+0.2$
June 28.9	5.08 $+1.20$	44.1 $+1.5$	1.00 $+1.18$	43.3 $+1.4$	29.34 $+0.62$	50.8 $-2.3$	6.88 $+1.19$	16.7 $+0.4$
7.9	5.29 $.23$	45.7 $1.6$	1.20 $.22$	44.7 $1.5$	30.03 $.77$	48.6 $2.0$	7.09 $.23$	17.2 $-0.6$
17.9	5.34 $.26$	47.4 $1.7$	1.44 $.25$	46.3 $1.6$	30.86 $.90$	46.8 $1.6$	7.34 $.26$	17.9 $-0.8$
27.8	5.81 $.28$	49.1 $1.8$	1.70 $.27$	48.0 $1.7$	31.81 $1.01$	45.4 $1.2$	7.62 $.29$	18.8 $1.0$
July 7.8	6.11 $.30$	50.9 $1.8$	1.99 $.29$	49.7 $1.7$	32.85 $1.09$	44.4 $-0.7$	7.92 $.31$	19.9 $1.1$
17.8	6.41 $+1.30$	52.6 $+1.7$	2.29 $+1.30$	51.3 $+1.6$	33.96 $+1.14$	43.9 $-0.3$	8.23 $+1.32$	21.1 $+1.2$
27.7	6.72 $.30$	54.3 $1.6$	2.59 $.30$	52.9 $1.5$	35.12 $1.16$	43.8 $+0.2$	8.56 $.32$	22.3 $1.3$
Aug. 6.7	7.02 $.30$	55.8 $1.5$	2.90 $.30$	54.4 $1.4$	36.30 $1.17$	44.3 $-0.7$	8.88 $.32$	23.7 $1.3$
16.7	7.31 $.29$	57.2 $1.3$	3.19 $.29$	55.8 $1.2$	37.47 $1.15$	45.2 $1.1$	9.21 $.31$	25.0 $1.3$
26.7	7.59 $.27$	58.3 $1.0$	3.48 $.28$	56.9 $1.0$	38.62 $1.12$	46.5 $1.5$	9.51 $.30$	26.3 $1.3$
Sept. 5.6	7.85 $+1.25$	59.3 $+0.8$	3.75 $+1.26$	57.9 $+0.8$	39.72 $+1.06$	48.2 $+1.9$	9.81 $+1.28$	27.5 $+1.2$
15.6	8.09 $.22$	59.9 $-0.5$	4.00 $.24$	58.5 $-0.5$	40.75 $.99$	50.3 $2.3$	10.08 $.26$	28.7 $1.1$
25.6	8.30 $.20$	60.3 $+0.3$	4.23 $.21$	58.9 $+0.3$	41.69 $.90$	52.8 $2.6$	10.33 $.24$	29.7 $1.0$
Oct. 5.6	8.48 $.17$	60.5 $-0.0$	4.42 $.18$	59.1 $-0.0$	42.54 $.79$	55.5 $2.9$	10.56 $.21$	30.7 $-0.8$
15.5	8.64 $.14$	60.4 $-0.2$	4.59 $.16$	59.0 $-0.2$	43.27 $.66$	58.5 $3.1$	10.76 $.18$	31.4 $-0.7$
25.5	8.76 $+1.11$	60.1 $-0.4$	4.74 $+1.13$	58.7 $-0.4$	43.87 $+0.53$	61.6 $+3.2$	10.93 $+1.16$	32.1 $+0.6$
Nov. 4.5	8.86 $.08$	59.6 $-0.6$	4.85 $.10$	58.3 $-0.6$	44.32 $.38$	64.9 $3.3$	11.08 $.13$	32.6 $-0.5$
14.4	8.92 $.05$	59.0 $-0.7$	4.94 $.07$	57.6 $-0.7$	44.62 $.21$	68.2 $3.3$	11.19 $.09$	33.0 $-0.3$
24.4	8.96 $+0.02$	58.2 $-0.8$	5.00 $.04$	56.9 $-0.8$	44.75 $+0.05$	71.4 $3.2$	11.26 $.06$	33.3 $-0.2$
Dec. 4.4	8.96 $-.01$	57.4 $-0.8$	5.02 $+0.01$	56.1 $-0.8$	44.71 $-.12$	74.5 $3.0$	11.30 $+0.03$	33.5 $+0.1$
14.4	8.94 $-.04$	56.6 $-0.8$	5.01 $-.02$	55.3 $-0.8$	44.50 $-.29$	77.4 $+2.7$	11.31 $-.01$	33.5 $-0.0$
24.3	8.89 $.07$	55.8 $-0.8$	4.97 $.05$	54.5 $-0.8$	44.13 $.45$	80.0 $2.4$	11.29 $.04$	33.5 $-0.1$
34.3	8.80 $-.10$	55.0 $-0.8$	4.90 $-.08$	53.6 $-0.8$	43.60 $-.58$	82.1 $+2.0$	11.22 $-.08$	33.4 $-0.2$

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Persei.		$\epsilon$ Eridani.		$\delta$ Persei.		$\gamma$ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 3 17	<sup>°</sup> <sup>'</sup> +49 30	<sup>h</sup> <sup>m</sup> 3 28	<sup>°</sup> <sup>'</sup> - 9 47	<sup>h</sup> <sup>m</sup> 3 35	<sup>°</sup> <sup>'</sup> +47 27	<sup>h</sup> <sup>m</sup> 3 41	<sup>°</sup> <sup>'</sup> +23 47
(Dec. 30.4)	<sup>s</sup> 9.38	<sup>"</sup> -11	<sup>s</sup> 12.23	<sup>"</sup> -07	<sup>s</sup> 46.78	<sup>"</sup> -08	<sup>s</sup> 31.02	<sup>"</sup> -04
Jan. 9.3	9.25	23.1	12.15	59.7	46.67	67.7	30.96	43.0
19.3	9.08	23.7	12.04	60.8	46.52	68.4	30.87	42.9
29.3	8.86	23.9	11.91	61.6	46.32	68.8	30.74	42.7
Feb. 8.2	8.62	23.8	11.75	62.2	46.10	68.9	30.59	42.3
18.2	8.38	23.3	11.59	62.6	45.86	68.5	30.42	41.9
28.2	8.11	22.5	11.42	62.7	45.61	67.8	30.25	41.4
Mar. 10.2	7.87	21.3	11.26	62.6	45.37	66.9	30.08	40.8
20.1	7.67	19.8	11.11	62.1	45.16	65.6	29.93	40.1
30.1	7.50	18.2	10.99	61.5	44.98	64.1	29.80	39.5
Apr. 9.1	7.39	16.4	10.90	60.6	44.86	62.5	29.70	38.8
19.0	7.33	14.5	10.84	59.4	44.78	60.8	29.65	38.3
29.0	7.35	12.7	10.83	58.0	44.78	59.1	29.65	37.8
May 9.0	7.43	11.0	10.87	56.4	44.83	57.5	29.69	37.4
19.0	7.58	9.4	10.94	54.6	44.95	56.0	29.78	37.3
28.9	7.80	8.1	11.07	52.6	45.14	54.6	29.92	37.3
June 7.9	8.07	7.0	11.24	50.6	45.38	53.5	30.11	37.4
17.9	8.40	6.2	11.44	48.5	45.68	52.7	30.34	37.8
27.9	8.77	5.7	11.67	46.4	46.02	52.2	30.60	38.4
July 7.8	9.17	5.6	11.93	44.3	46.40	51.9	30.89	39.1
17.8	9.60	5.8	12.21	42.4	46.80	52.0	31.20	40.0
27.8	10.04	6.3	12.50	40.6	47.22	52.3	31.52	41.0
Aug. 6.8	10.49	7.2	12.80	39.1	47.65	53.0	31.85	42.0
16.7	10.93	8.3	13.09	37.8	48.08	53.9	32.18	43.1
26.7	11.36	9.6	13.38	36.9	48.51	55.0	32.50	44.2
Sept. 5.7	11.78	11.1	13.66	36.3	48.91	56.3	32.81	45.3
15.6	12.16	12.9	13.92	36.0	49.30	57.8	33.11	46.3
25.6	12.52	14.8	14.16	36.2	49.67	59.4	33.39	47.3
Oct. 5.6	12.85	16.8	14.38	36.7	50.01	61.2	33.65	48.2
15.6	13.14	18.8	14.57	37.5	50.31	63.0	33.89	48.9
25.5	13.39	20.9	14.74	38.6	50.57	64.9	34.09	49.6
Nov. 4.5	13.60	23.0	14.87	39.9	50.80	66.8	34.27	50.1
14.5	13.75	25.1	14.98	41.4	50.98	68.7	34.42	50.6
24.5	13.86	27.1	15.05	43.0	51.12	70.5	34.54	51.0
Dec. 4.4	13.92	28.9	15.09	44.6	51.20	72.2	34.62	51.4
14.4	13.92	30.6	15.10	46.2	51.23	73.8	34.65	51.6
24.4	13.87	32.0	15.07	47.7	51.21	75.2	34.66	51.8
34.4	13.76	33.2	15.00	49.0	51.13	76.4	34.62	51.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Persei.		γ Eridani.		γ Tauri.		ε Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 3 47	° ' " +31 35	h m 3 53	° ' " -13 47	h m 4 14	° ' " +15 23	h m 4 22	° ' " +18 57
(Dec. 30.4)	49.38 -.04	11.2 +0.5	21.10 -.05	45.1 -1.6	5.02 -.01	7.2 -.03	45.47 .00	28.9 -.02
Jan. 9.3	49.31 .08	11.5 0.3	21.03 .08	46.6 1.4	4.98 .05	6.9 0.4	45.45 -.04	28.8 0.2
19.3	49.21 .12	11.7 +0.1	20.93 .12	47.9 1.1	4.91 .09	6.5 0.4	45.38 .08	28.6 0.2
29.3	49.08 .15	11.8 -0.1	20.80 .14	48.9 0.9	4.81 .12	6.1 0.4	45.28 .12	28.3 0.3
Feb. 8.3	48.92 .17	11.6 0.3	20.65 .16	49.7 0.6	4.67 .15	5.8 0.4	45.15 .15	28.1 0.3
18.2	48.73 -.19	11.2 -.04	20.48 -.17	50.2 -.03	4.51 -.16	5.4 -.04	44.99 -.17	27.8 -.03
28.2	48.54 -.19	10.7 0.6	20.30 .17	50.3 0.0	4.35 .17	5.0 0.4	44.82 .17	27.4 0.4
Mar. 10.2	48.36 .18	10.0 0.8	20.13 .17	50.2 +0.3	4.18 .17	4.7 0.4	44.64 .17	27.0 0.4
20.2	48.19 .16	9.2 0.9	19.96 .15	49.8 0.6	4.02 .15	4.3 0.3	44.48 .16	26.6 0.4
30.1	48.05 .13	8.3 0.9	19.82 .13	49.1 0.8	3.88 .13	4.0 0.3	44.33 .14	26.2 0.4
Apr. 9.1	47.94 -.09	7.3 -0.9	19.71 -.10	48.1 +1.1	3.76 -.10	3.8 -.02	44.21 -.11	25.9 -.03
19.1	47.87 -.04	6.4 0.9	19.63 .06	46.8 1.4	3.68 .06	3.6 -0.1	44.12 .07	25.6 0.2
29.0	47.86 +0.1	5.5 0.8	19.59 -.01	45.3 1.6	3.65 -.01	3.6 0.0	44.07 -.02	25.4 -0.1
May 9.0	47.90 .06	4.7 0.7	19.60 +0.3	43.6 1.8	3.66 +0.3	3.7 +0.2	44.08 +0.3	25.3 0.0
19.0	47.99 .12	4.0 0.6	19.66 .08	41.7 2.0	3.71 .08	4.0 0.3	44.13 .07	25.3 +0.1
June 29.0	48.13 +1.7	3.6 -0.4	19.76 +1.2	39.6 +2.1	3.81 +1.2	4.4 +0.5	44.22 +1.2	25.5 +0.2
7.9	48.33 .21	3.3 -0.2	19.90 .16	37.4 2.2	3.96 .17	4.9 0.6	44.36 .16	25.8 0.4
17.9	48.56 .25	3.2 0.0	20.08 .20	35.2 2.2	4.15 .21	5.6 0.8	44.55 .20	26.2 0.5
27.9	48.84 .29	3.3 +0.2	20.29 .23	32.9 2.2	4.37 .24	6.4 0.9	44.77 .24	26.8 0.6
July 7.9	49.14 .32	3.7 0.4	20.54 .26	30.8 2.1	4.62 .26	7.4 1.0	45.02 .27	27.5 0.7
17.8	49.47 +3.3	4.2 +0.6	20.81 +2.8	28.7 +1.9	4.90 +2.9	8.4 +1.0	45.30 +2.9	28.3 +0.8
27.8	49.81 .35	4.9 0.8	21.09 .29	26.9 1.7	5.19 .30	9.4 1.0	45.60 .30	29.2 0.9
Aug. 6.8	50.16 .35	5.8 0.9	21.38 .30	25.3 1.5	5.50 .31	10.4 1.0	45.90 .31	30.0 0.9
16.7	50.51 .35	6.7 1.0	21.68 .30	24.0 1.1	5.81 .31	11.4 1.0	46.22 .31	30.9 0.9
26.7	50.86 .34	7.8 1.1	21.98 .29	23.1 0.7	6.12 .31	12.3 0.9	46.53 .31	31.7 0.8
Sept. 5.7	51.19 +3.3	8.9 +1.1	22.26 +2.8	22.5 +0.4	6.42 +3.0	13.1 +0.7	46.84 +3.1	32.5 +0.7
15.7	51.51 .31	10.0 1.1	22.54 .27	22.3 0.0	6.72 .29	13.8 0.6	47.15 .30	33.2 0.6
25.6	51.82 .29	11.1 1.1	22.80 .25	22.6 -0.4	7.00 .27	14.3 0.5	47.44 .28	33.7 0.5
Oct. 5.6	52.10 .27	12.2 1.1	23.04 .23	23.2 0.8	7.26 .26	14.7 0.5	47.71 .27	34.2 0.4
15.6	52.36 .24	13.3 1.0	23.25 .20	24.2 1.2	7.51 .24	14.9 +0.1	47.97 .25	34.5 0.3
25.6	52.59 +3.1	14.3 +1.0	23.44 +1.7	25.5 -1.4	7.73 +2.1	15.0 0.0	48.21 +2.3	34.7 +0.2
Nov. 4.5	52.79 .18	15.3 1.0	23.60 .14	27.1 1.7	7.94 .19	15.0 -0.1	48.42 .20	34.8 +0.1
14.5	52.96 .15	16.2 0.9	23.73 .11	28.8 1.8	8.11 .16	14.8 0.2	48.61 .17	34.8 0.0
24.5	53.09 .11	17.1 0.8	23.82 .08	30.7 1.9	8.25 .12	14.6 0.3	48.76 .14	34.8 -0.1
Dec. 4.4	53.18 .07	17.9 0.7	23.89 .04	32.6 1.9	8.35 .09	14.3 0.3	48.88 .10	34.7 0.1
14.4	53.22 +0.3	18.6 +0.6	23.91 +0.1	34.5 -1.8	8.42 +0.5	13.9 -0.3	48.96 +0.6	34.6 -0.1
24.4	53.23 -.02	19.2 0.5	23.90 -.03	36.3 1.7	8.45 +0.1	13.6 0.3	49.00 +0.2	34.4 0.2
34.4	53.19 -.06	19.6 +0.4	23.85 -.06	38.0 -1.6	8.44 -.03	13.3 -0.3	49.00 -.02	34.3 -0.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Tauri. (Aldebaran.)		$\alpha$ Camelopardalis.		$\epsilon$ Aurigæ.		$\iota$ Orionis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 4 30	° ' " +16 18	h m 4 44	° ' " +66 10	h m 4 50	° ' " +33 0	h m 4 58	° ' " +15 15
(Dec. 30.4)	9.85 .00	27.6 -0.3	5.15 -0.05	27.0 +2.4	27.72 +0.02	28.9 +0.6	50.27 +0.03	51.8 -0.4
Jan. 9.4	9.83 -.04	27.3 0.3	5.05 .15	29.2 2.1	27.71 -.03	29.5 0.5	50.27 -.02	51.4 0.4
19.4	9.77 .08	27.0 0.3	4.85 .24	31.1 1.7	27.66 .08	30.0 0.4	50.23 .06	51.0 0.3
29.3	9.67 .11	26.7 0.3	4.57 .32	32.7 1.3	27.56 .12	30.4 0.3	50.15 .10	50.7 0.3
Feb. 8.3	9.54 .14	26.3 0.3	4.21 .39	33.8 0.9	27.42 .16	30.6 +0.1	50.03 .13	50.4 0.3
18.3	9.38 -.16	26.0 -0.3	3.79 -.43	34.5 +0.4	27.25 -.18	30.6 0.0	49.89 -.16	50.1 -0.3
28.2	9.22 .17	25.7 0.3	3.34 .46	34.7 -0.1	27.05 .20	30.5 -0.2	49.72 .17	49.8 0.3
Mar. 10.2	9.04 .17	25.5 0.3	2.87 .46	34.4 0.6	26.85 .20	30.2 0.4	49.55 .17	49.5 0.2
20.2	8.88 .16	25.0 0.3	2.43 .43	33.6 1.0	26.65 .19	29.7 0.5	49.37 .17	49.3 0.2
30.2	8.73 .14	24.7 0.3	2.01 .38	32.4 1.4	26.47 .17	29.1 0.7	49.21 .15	49.1 0.2
Apr. 9.1	8.60 -.11	24.4 -0.2	1.66 -.32	30.7 -1.8	26.32 -.14	28.4 -0.8	49.07 -.13	48.9 -0.1
19.1	8.51 .07	24.3 -0.1	1.38 .24	28.8 2.1	26.19 .10	27.6 0.8	48.96 .09	48.8 -0.1
29.1	8.46 -.03	24.2 0.0	1.18 .15	26.7 2.3	26.12 -.05	26.8 0.8	48.89 .05	48.8 0.0
May 9.1	8.45 +0.02	24.2 +0.1	1.09 -.04	24.3 2.4	26.09 .00	25.9 0.8	48.85 -.01	48.9 +0.1
19.0	8.49 .06	24.4 0.2	1.10 +0.06	21.9 2.4	26.12 +0.05	25.1 0.8	48.87 +0.04	49.1 0.3
29.0	8.58 +0.11	24.7 +0.4	1.21 +0.16	19.5 -2.3	26.19 +0.10	24.4 -0.7	48.93 +0.08	49.4 +0.4
June 8.0	8.71 .15	25.1 0.5	1.42 .26	17.2 2.2	26.32 .15	23.8 0.5	49.03 .13	49.8 0.5
17.9	8.89 .19	25.7 0.6	1.73 .35	15.1 2.1	26.50 .20	23.3 0.4	49.18 .17	50.3 0.6
27.9	9.10 .23	26.4 0.7	2.13 .43	13.1 1.8	26.72 .24	23.0 0.2	49.37 .20	51.0 0.7
July 7.9	9.34 .26	27.2 0.8	2.60 .51	11.4 1.5	26.98 .28	22.9 -0.1	49.58 .23	51.7 0.7
17.9	9.61 +0.28	28.1 +0.9	3.14 +0.57	10.0 -1.2	27.27 +0.30	22.8 0.0	49.83 +0.26	52.5 +0.8
27.8	9.90 .29	29.0 0.9	3.73 .61	8.9 0.9	27.58 .32	22.9 +0.2	50.10 .28	53.3 0.8
Aug. 6.8	10.20 .30	29.9 0.9	4.37 .65	8.2 0.6	27.92 .34	23.2 0.3	50.38 .29	54.1 0.8
16.8	10.50 .31	30.7 0.9	5.03 .67	7.8 -0.2	28.26 .35	23.5 0.4	50.68 .30	54.8 0.7
26.8	10.81 .31	31.5 0.8	5.70 .68	7.8 +0.2	28.61 .35	24.0 0.5	50.98 .30	55.5 0.6
Sept. 5.7	11.12 +0.30	32.2 +0.6	6.39 +0.68	8.2 +0.5	28.96 +0.35	24.5 +0.5	51.29 +0.30	56.0 +0.5
15.7	11.42 .29	32.8 0.5	7.07 .67	8.8 0.8	29.31 .34	25.0 0.6	51.59 .30	56.5 0.4
25.7	11.71 .28	33.3 0.4	7.73 .65	9.9 1.2	29.65 .33	25.6 0.6	51.89 .29	56.8 0.2
Oct. 5.6	11.99 .27	33.6 0.2	8.36 .62	11.2 1.5	29.97 .32	26.2 0.6	52.18 .28	56.9 +0.1
15.6	12.25 .25	33.8 +0.1	8.96 .57	12.8 1.7	30.28 .30	26.9 0.6	52.45 .27	56.9 0.0
25.6	12.49 +0.23	33.8 0.0	9.51 +0.52	14.7 +2.0	30.57 +0.28	27.5 +0.6	52.71 +0.26	56.8 -0.2
Nov. 4.6	12.70 .20	33.8 -0.1	10.01 .46	16.8 2.2	30.84 .25	28.2 0.7	52.95 .23	56.5 0.3
14.6	12.89 .17	33.6 0.2	10.43 .39	19.1 2.4	31.08 .22	28.8 0.7	53.16 .20	56.2 0.4
24.5	13.05 .14	33.4 0.3	10.78 .30	21.6 2.5	31.29 .18	29.5 0.7	53.35 .17	55.8 0.4
Dec. 4.5	13.17 .11	33.1 0.3	11.04 .21	24.1 2.5	31.45 .14	30.2 0.7	53.50 .14	55.3 0.4
14.5	13.26 +0.07	32.7 -0.3	11.20 +0.11	26.7 +2.5	31.57 +0.10	30.9 +0.7	53.61 +0.10	54.9 -0.4
24.4	13.30 +0.02	32.4 0.3	11.26 .01	29.1 2.4	31.64 +0.05	31.6 0.6	53.68 .05	54.4 0.4
34.4	13.30 -0.02	32.2 -0.3	11.21 +0.10	31.5 +2.2	31.67 .00	32.2 +0.6	53.71 +0.01	54.0 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>a</i> Aurigæ. ( <i>Capella</i> .)		<i>β</i> Orionis. ( <i>Rigel</i> .)		<i>β</i> Tauri.		Groombridge 966.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 5 9	° ' " +45 53	h m 5 9	° ' " - 8 18	h m 5 19	° ' " +28 31	h m 5 26	° ' " +74 58
(Dec. 30.4)	16.95 +.04	49.5 +1.4	43.29 +.02	66.1 -1.7	57.17 +.05	23.5 +0.4	21.34+ .01	44.3 +2.8
Jan. 9.4	16.96 -.02	50.8 1.2	43.29 -.02	67.7 1.6	57.20 .00	23.9 0.3	21.27- .14	47.0 2.6
19.4	16.90 .08	52.0 1.1	43.24 .07	69.2 1.3	57.17 -.05	24.2 0.3	21.04 .30	49.5 2.3
29.4	16.79 .14	53.0 0.9	43.15 .10	70.4 1.1	57.10 .09	24.5 0.2	20.66 .44	51.6 2.0
Feb. 8.3	16.62 .18	53.7 0.6	43.03 .13	71.5 0.9	56.99 .13	24.7 +0.1	20.14 .56	53.4 1.6
18.3	16.42 -.22	54.2 +0.3	42.89 -.16	72.2 -0.6	56.83 -.16	24.8 0.0	19.52- .65	54.8 +1.1
28.3	16.18 .24	54.4 0.0	42.72 .17	72.8 0.4	56.66 .18	24.8 -0.1	18.82 .71	55.6 +0.6
Mar. 10.2	15.93 .25	54.2 -0.3	42.54 .18	73.0 -0.1	56.47 .19	24.6 0.2	18.07 .74	55.9 0.0
20.2	15.68 .24	53.8 0.6	42.36 .18	73.1 +0.1	56.27 .19	24.4 0.3	17.32 .73	55.6 -0.3
30.2	15.45 .22	53.1 0.8	42.19 .16	72.8 0.4	56.09 .17	24.0 0.4	16.60 .68	54.8 1.0
Apr. 9.2	15.24 -.19	52.2 -1.1	42.03 -.14	72.3 +0.6	55.92 -.15	23.5 -0.5	15.94- .61	53.5 -1.3
19.1	15.08 .14	51.0 1.3	41.91 .11	71.6 0.9	55.79 .12	23.0 0.5	15.37 .51	51.8 1.9
29.1	14.96 .09	49.7 1.4	41.82 .07	70.6 1.1	55.69 .08	22.4 0.6	14.91 .38	49.7 2.2
May 9.1	14.89 -.03	48.3 1.4	41.76 -.03	69.4 1.3	55.64 -.03	21.9 0.6	14.59 .25	47.3 2.5
19.1	14.89 +.03	46.8 1.4	41.75 +.01	68.0 1.5	55.64 +.02	21.3 0.5	14.42- .10	44.8 2.6
29.0	14.96 +.09	45.4 -1.4	41.78 +.05	66.5 +1.6	55.68 +.07	20.8 -0.5	14.40+ .05	42.1 -2.7
June 8.0	15.08 .15	44.0 1.3	41.86 .10	64.8 1.7	55.77 .12	20.4 0.4	14.53 .21	39.3 2.7
18.0	15.26 .11	42.7 1.2	41.97 .14	63.0 1.8	55.92 .16	20.1 0.3	14.82 .35	36.6 2.6
27.9	15.49 .26	41.5 1.1	41.93 .17	61.1 1.9	56.10 .20	19.9 0.2	15.25 .49	34.0 2.5
July 7.9	15.77 .30	40.5 0.9	42.32 .20	59.3 1.8	56.32 .24	19.8 -0.1	15.81 .61	31.6 2.3
17.9	16.09 +.34	39.7 -0.7	42.53 +.23	57.5 +1.7	56.57 +.27	19.7 0.0	16.49+ .73	29.5 -2.0
27.9	16.44 .37	39.1 0.5	42.77 .25	55.8 1.6	56.85 .29	19.8 +0.1	17.28 .82	27.6 1.7
Aug. 6.8	16.82 .39	38.7 0.3	43.03 .27	54.3 1.4	57.16 .31	20.0 0.2	18.15 .90	26.1 1.3
16.8	17.22 .40	38.5 -0.1	43.31 .28	53.0 1.1	57.47 .32	20.2 0.2	19.08 .96	24.9 1.0
26.8	17.63 .41	38.5 +0.1	43.59 .28	52.0 0.8	57.80 .33	20.4 0.3	20.07 1.01	24.1 0.6
Sept. 5.8	18.04 +.41	38.7 +0.3	43.88 +.29	51.3 +0.5	58.13 +.33	20.7 +0.3	21.10+1.03	23.7 -0.2
15.7	18.46 .41	39.0 0.4	44.17 .29	51.0 +0.1	58.47 .33	21.0 0.3	22.14 1.03	23.7 +0.2
25.7	18.87 .40	39.5 0.6	44.45 .28	51.0 -0.2	58.80 .33	21.2 0.2	23.18 1.02	24.1 0.6
Oct. 5.7	19.27 .39	40.2 0.7	44.72 .27	51.5 0.6	59.12 .32	21.5 0.2	24.20 1.00	24.9 1.0
15.6	19.65 .37	41.0 0.9	44.99 .26	52.2 0.9	59.44 .31	21.7 0.2	25.18 .95	26.1 1.3
25.6	20.01 +.35	41.9 +1.0	45.24 +.24	53.3 -1.2	59.74 +.29	21.9 +0.2	26.11+ .88	27.6 +1.7
Nov. 4.6	20.35 .32	43.0 1.1	45.46 .22	54.7 1.5	60.02 .27	22.2 0.2	26.96 .80	29.5 2.0
14.6	20.65 .28	44.2 1.2	45.67 .19	56.3 1.7	60.27 .24	22.4 0.2	27.71 .69	31.7 2.3
24.5	20.91 .24	45.5 1.3	45.84 .16	58.1 1.8	60.50 .21	22.7 0.3	28.36 .57	34.1 2.6
Dec. 4.5	21.13 .19	46.8 1.4	45.98 .12	59.9 1.9	60.69 .17	23.0 0.3	28.86 .43	36.8 2.7
14.5	21.29 +.13	48.2 +1.4	46.08 +.08	61.8 -1.9	60.84 +.13	23.3 +0.3	29.22+ .28	39.6 +2.8
24.5	21.39 .07	49.6 1.4	46.15 +.04	63.6 1.8	60.94 .08	23.6 0.3	29.42+ .12	42.4 2.8
34.4	21.43 +.01	51.0 +1.3	46.17 .00	65.4 -1.7	61.00 +.03	23.9 +0.4	29.45- .05	45.2 +2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Orionis.		$\alpha$ Leporis.		$\epsilon$ Orionis.		$\alpha$ Columbae.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 5 26	° ' " — 0 22	h m 5 28	° ' " — 17 53	h m 5 31	° ' " — 1 15	h m 5 35	° ' " — 34 7
(Dec. 30.4)	53.14 +.04	25.7 —1.4	18.81 +.03	41.8 +2.3	7.64 +.04	58.8 —1.4	61.91 +.01	43.4 —3.0
Jan. 9.4	53.16 .00	27.0 1.2	18.81 —.02	43.9 2.1	7.66 .00	60.2 1.3	61.89 —.05	46.3 2.7
19.4	53.14 —.05	28.1 1.1	18.76 .07	45.9 1.8	7.64 —.04	61.4 1.1	61.82 .10	48.8 2.4
29.4	53.07 —.09	29.1 0.9	18.68 .11	47.6 1.5	7.57 .08	62.4 1.0	61.70 .14	51.0 2.0
Feb. 8.3	52.96 .12	29.9 0.7	18.55 .14	48.9 1.2	7.47 .12	63.3 0.8	61.54 .18	52.8 1.6
18.3	52.83 —.15	30.6 —0.6	18.40 —.17	50.0 +0.9	7.34 —.15	64.0 —0.6	61.34 —.21	54.2 —1.2
28.3	52.67 .17	31.1 0.4	18.22 .19	50.7 0.6	7.18 .17	64.5 0.4	61.12 .23	55.2 0.7
Mar 10.3	52.50 .17	31.4 —0.2	18.03 .19	51.1 +0.2	7.00 .17	64.8 —0.2	60.88 .24	55.7 —0.3
20.2	52.32 .17	31.5 0.0	17.83 .19	51.1 —0.1	6.83 .17	64.9 0.0	60.64 .24	55.8 +0.2
30.2	52.15 .16	31.4 +0.2	17.64 .18	50.8 0.4	6.66 .16	64.9 +0.2	60.40 .23	55.4 0.6
Apr. 9.2	52.00 —.14	31.2 +0.3	17.46 —.16	50.2 —0.8	6.50 —.14	64.6 +0.4	60.18 —.21	54.6 +1.0
19.1	51.87 .11	30.7 0.5	17.32 .13	49.3 1.1	6.37 .12	64.1 0.5	59.98 .18	53.3 1.4
29.1	51.77 .08	30.1 0.7	17.20 .10	48.1 1.4	6.27 .08	63.5 0.7	59.82 .14	51.7 1.8
May 9.1	51.71 —.04	29.3 0.9	17.12 .06	46.6 1.6	6.21 —.04	62.7 0.9	59.70 .10	49.8 2.1
19.1	51.69 .00	28.4 1.0	17.08 —.02	44.9 1.8	6.18 .00	61.7 1.1	59.62 .05	47.5 2.4
29.0	51.72 +.04	27.3 +1.2	17.08 +.03	42.9 —2.0	6.20 +.04	60.6 +1.2	59.59 —.01	45.0 +2.6
June 8.0	51.78 .09	26.1 1.3	17.13 .07	40.8 2.1	6.26 .08	59.3 1.3	59.61 +.04	42.3 2.7
18.0	51.89 .13	24.7 1.3	17.22 .12	38.6 2.2	6.37 .12	58.0 1.4	59.67 .09	39.6 2.8
28.0	52.04 .16	23.4 1.4	17.35 .15	36.4 2.2	6.51 .16	56.5 1.4	59.78 .15	36.7 2.8
July 7.9	52.22 .19	21.9 1.4	17.52 .18	34.2 2.2	6.68 .19	55.1 1.4	59.94 .17	33.9 2.7
17.9	52.42 +.22	20.5 +1.4	17.72 +.21	32.0 —2.1	6.89 +.22	53.7 +1.4	60.13 +.21	31.2 +2.6
27.9	52.66 .24	19.2 1.3	17.95 .24	30.0 1.9	7.12 .24	52.3 1.3	60.36 .24	28.7 2.3
Aug. 6.8	52.91 .26	18.0 1.1	18.20 .26	28.2 1.6	7.37 .26	51.0 1.2	60.62 .27	26.5 2.0
16.8	53.18 .27	16.9 1.0	18.47 .27	26.7 1.5	7.64 .27	49.9 1.0	60.90 .29	24.7 1.7
26.8	53.46 .28	16.0 0.7	18.75 .28	25.5 1.0	7.91 .28	49.1 0.7	61.20 .30	23.2 1.2
Sept. 5.8	53.74 +.29	15.4 +0.5	19.03 +.29	24.7 —0.6	8.20 +.29	48.5 +0.5	61.51 +.31	22.3 +0.7
15.7	54.03 .29	15.1 +0.2	19.32 .29	24.4 —0.1	8.48 .29	48.1 +0.2	61.83 .32	21.9 +0.1
25.7	54.32 .28	15.1 —0.1	19.62 .29	24.5 +0.3	8.77 .28	48.2 —0.2	62.15 .32	22.0 —0.4
Oct. 5.7	54.60 .28	15.4 0.4	19.90 .28	25.1 0.8	9.05 .28	48.5 0.5	62.46 .31	22.7 1.0
15.7	54.87 .27	16.0 0.7	20.18 .27	26.1 1.2	9.33 .27	49.1 0.7	62.76 .29	24.0 1.5
25.6	55.13 +.25	16.8 —1.0	20.44 +.25	27.5 +1.6	9.59 +.25	50.0 —1.0	63.05 +.27	25.8 —2.0
Nov. 4.6	55.38 .23	17.9 1.2	20.68 .23	29.2 1.9	9.84 .23	51.1 1.2	63.31 .24	28.0 2.4
14.6	55.60 .21	19.2 1.3	20.90 .20	31.2 2.1	10.06 .21	52.4 1.4	63.54 .21	30.6 2.7
24.5	55.80 .18	20.6 1.4	21.08 .17	33.5 2.3	10.26 .18	53.8 1.5	63.74 .17	33.4 2.9
Dec. 4.5	55.96 .15	22.0 1.5	21.24 .13	35.9 2.4	10.43 .15	55.4 1.5	63.89 .13	36.5 3.1
14.5	56.08 +.11	23.5 —1.5	21.35 +.09	38.3 +2.4	10.56 +.11	56.9 —1.5	64.00 +.08	39.6 —3.1
24.5	56.17 .06	25.0 1.4	21.42 +.05	40.7 2.3	10.65 .07	58.4 1.5	64.06 +.03	42.6 3.0
34.4	56.21 +.02	26.3 —1.3	21.45 .00	42.9 +2.1	10.69 +.02	60.0 —1.5	64.07 —.02	45.5 —2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Orionis.		$\nu$ Orionis.		22 Camelop. (H.)		$\mu$ Geminorum.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 5 49	<sup>°</sup> <sup>'</sup> + 7 23	<sup>h</sup> <sup>m</sup> 6 1	<sup>°</sup> <sup>'</sup> + 14 46	<sup>h</sup> <sup>m</sup> 6 7	<sup>°</sup> <sup>'</sup> + 69 21	<sup>h</sup> <sup>m</sup> 6 16	<sup>°</sup> <sup>'</sup> + 22 33
(Dec. 30.5)	<sup>s</sup> 44.68	<sup>"</sup> +0.07	<sup>s</sup> 50.97	<sup>"</sup> +0.08	<sup>s</sup> 48.88	<sup>"</sup> +1.15	<sup>s</sup> 53.78	<sup>"</sup> +1.10
Jan. 9.5	44.72	+0.02	51.03	+0.04	48.96	+0.02	53.86	+0.06
19.4	44.72	-0.02	51.04	-0.01	48.92	-0.10	53.89	+0.01
29.4	44.68	+0.06	51.01	+0.06	48.76	+0.22	53.87	-0.04
Feb. 8.4	44.59	-0.10	50.93	-0.10	48.48	-0.33	53.80	-0.09
18.4	44.46	-0.13	50.81	-0.13	48.10	-0.42	53.69	-0.13
28.3	44.32	-0.15	50.67	-0.16	47.64	-0.48	53.55	-0.16
Mar. 10.3	44.15	-0.17	50.50	-0.17	47.13	-0.52	53.38	-0.18
20.3	43.97	-0.17	50.32	-0.18	46.59	-0.54	53.19	-0.18
30.3	43.80	-0.16	50.15	-0.17	46.05	-0.53	53.01	-0.18
Apr. 9.2	43.64	-0.15	49.98	-0.15	45.54	-0.49	52.84	-0.16
19.2	43.50	-0.12	49.84	-0.13	45.08	-0.43	52.68	-0.14
29.2	43.40	-0.09	49.73	-0.10	44.69	-0.35	52.55	-0.11
May 9.2	43.33	+0.05	49.65	+0.06	44.38	-0.25	52.46	-0.07
19.1	43.29	-0.01	49.61	-0.02	44.18	-0.15	52.41	-0.03
29.1	43.30	+0.03	49.61	+0.02	44.08	-0.04	52.40	+0.01
June 8.1	43.35	+0.07	49.66	+0.07	44.10	+0.07	52.43	+0.06
18.0	43.45	+0.11	49.74	+0.11	44.22	+0.18	52.51	+0.10
28.0	43.58	+0.15	49.87	+0.14	44.46	+0.29	52.63	+0.14
July 8.0	43.75	+0.18	50.03	+0.18	44.79	+0.38	52.79	+0.18
18.0	43.94	+0.21	50.23	+0.21	45.22	+0.47	52.98	+0.21
27.9	44.17	+0.24	50.45	+0.24	45.73	+0.55	53.20	+0.24
Aug. 6.9	44.41	+0.26	50.70	+0.26	46.32	+0.62	53.45	+0.26
16.9	44.68	+0.27	50.96	+0.27	46.97	+0.67	53.72	+0.28
26.8	44.95	+0.28	51.24	+0.29	47.67	+0.72	54.01	+0.29
Sept. 5.8	45.24	+0.29	51.53	+0.30	48.40	+0.75	54.31	+0.30
15.8	45.53	+0.29	51.83	+0.30	49.16	+0.77	54.62	+0.31
25.8	45.82	+0.29	52.13	+0.30	49.94	+0.78	54.93	+0.32
Oct. 5.7	46.11	+0.29	52.44	+0.30	50.72	+0.78	55.25	+0.32
15.7	46.40	+0.29	52.74	+0.30	51.49	+0.76	55.57	+0.32
25.7	46.68	+0.28	53.03	+0.29	52.24	+0.73	55.88	+0.31
Nov. 4.7	46.95	+0.26	53.31	+0.27	52.95	+0.68	56.19	+0.30
14.6	47.19	+0.23	53.58	+0.25	53.60	+0.62	56.48	+0.28
24.6	47.41	+0.20	53.82	+0.22	54.19	+0.54	56.74	+0.25
Dec. 4.6	47.60	+0.17	54.03	+0.19	54.68	+0.45	56.97	+0.22
14.5	47.76	+0.14	54.20	+0.15	55.08	+0.34	57.18	+0.18
24.5	47.88	+0.10	54.33	+0.11	55.36	+0.28	57.33	+0.13
34.5	47.95	+0.05	54.42	+0.07	55.52	+0.09	57.44	+0.09



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Argûs. ( <i>Canopus</i> .)		$\gamma$ Geminorum.		$\alpha$ Canis Majoris. ( <i>Sirius</i> .)		$\epsilon$ Canis Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 6 21	° ' " -52 38	h m 6 31	° ' " +16 29	h m 6 40	° ' " -16 34	h m 6 54	° ' " -28 49
(Dec. 30.5)	45.35 +.02	27.1 -3.6	55.26 +.12	6.4 -0.5	44.22 +.10	39.4 -2.5	41.76 +.10	66.2 -3.1
Jan. 9.5	45.33 -.05	30.6 3.4	55.36 .07	5.9 0.4	44.29 +.03	41.8 2.4	41.84 +.05	69.3 2.9
19.4	45.24 .12	33.9 3.1	55.40 +.02	5.5 0.3	44.31 .00	44.1 2.2	41.86 -.01	72.1 2.7
29.4	45.09 .19	36.9 2.8	55.39 -.03	5.2 0.2	44.28 -.05	46.2 1.9	41.83 .06	74.7 2.4
Feb. 8.4	44.87 .24	39.5 2.4	55.34 .08	5.0 0.1	44.21 .09	47.9 1.6	41.75 .10	77.0 2.1
18.4	44.60 -.29	41.6 -1.9	55.24 -.12	4.9 -0.1	44.10 -.13	49.4 -1.3	41.62 -.14	78.9 -1.8
28.3	44.29 .33	43.3 1.4	55.10 .15	4.9 0.0	43.95 .16	50.6 1.0	41.46 .18	80.5 1.4
Mar. 10.3	43.95 .35	44.5 0.9	54.95 .17	4.9 0.0	43.78 .18	51.4 0.7	41.27 .20	81.7 1.0
20.3	43.59 .36	45.1 -0.4	54.77 .18	4.9 0.0	43.59 .19	51.9 -0.4	41.06 .21	82.5 0.6
30.3	43.23 .36	45.2 +0.1	54.59 .18	4.9 0.0	43.40 .19	52.1 0.0	40.84 .22	82.8 -0.2
Apr. 9.2	42.88 -.34	44.8 +0.7	54.42 -.16	4.9 0.0	43.21 -.18	52.0 +0.3	40.62 -.21	82.8 +0.2
19.2	42.55 .31	43.9 1.1	54.27 .14	4.9 0.0	43.03 .16	51.6 0.6	40.42 .19	82.3 0.6
29.2	42.25 .28	42.5 1.6	54.14 .11	4.9 0.0	42.58 .14	50.8 0.9	40.23 .17	81.5 1.0
May 9.2	42.00 .23	40.7 2.0	54.04 .08	5.0 +0.1	42.75 .11	49.8 1.1	40.08 .14	80.3 1.4
19.1	41.79 .18	38.5 2.4	53.98 -.04	5.1 0.1	42.66 .07	48.6 1.4	39.95 .10	78.8 1.7
29.1	41.64 -.12	35.9 +2.7	53.96 .00	5.2 +0.1	42.61 -.03	47.1 +1.6	39.87 -.06	77.0 +2.0
June 8.1	41.55 -.06	33.1 2.9	53.97 +.04	5.3 0.2	42.59 +.01	45.4 1.8	39.82 -.03	74.9 2.2
18.0	41.51 .00	30.1 3.1	54.04 .08	5.6 0.3	42.62 .04	43.5 1.9	39.82 +.02	72.6 2.4
28.0	41.54 +.06	27.0 3.2	54.14 .12	5.8 0.3	42.68 .08	41.6 2.0	39.85 .06	70.2 2.5
July 8.0	41.63 .12	23.8 3.2	54.27 .15	6.1 0.3	42.78 .12	39.6 2.0	39.93 .10	67.7 2.5
18.0	41.78 +.17	20.7 +3.0	54.44 +.19	6.4 +0.3	42.91 +.15	37.6 +1.9	40.05 +.13	65.2 +2.4
27.9	41.98 .23	17.7 2.8	54.64 .21	6.6 0.2	43.08 .18	35.8 1.8	40.20 .17	62.8 2.3
Aug. 6.9	42.23 .28	15.0 2.5	54.87 .24	6.9 0.2	43.27 .21	34.0 1.6	40.38 .20	60.6 2.1
16.9	42.53 .32	12.6 2.2	55.12 .26	7.1 +0.1	43.49 .23	32.5 1.4	40.60 .23	58.6 1.8
26.8	42.86 .35	10.7 1.7	55.38 .27	7.2 0.0	43.73 .25	31.3 1.1	40.84 .25	56.9 1.5
Sept. 5.8	43.23 +.38	9.2 +1.2	55.67 +.29	7.2 -0.1	43.99 +.27	30.4 +0.7	41.11 +.27	55.7 +1.0
15.8	43.62 .40	8.3 +0.6	55.96 .30	7.1 0.2	44.27 .28	29.9 +0.3	41.39 .29	54.9 0.6
25.8	44.02 .41	8.1 -0.1	56.26 .31	6.8 0.3	44.55 .29	29.8 -0.1	41.69 .30	54.5 +0.1
Oct. 5.7	44.43 .41	8.5 0.7	56.57 .31	6.4 0.4	44.85 .29	30.2 0.6	42.00 .31	54.7 -0.3
15.7	44.83 .40	9.5 1.3	56.88 .31	5.9 0.6	45.14 .29	31.0 1.0	42.31 .31	55.5 1.0
25.7	45.22 +.38	11.1 -1.9	57.19 +.30	5.3 -0.7	45.43 +.29	32.3 -1.4	42.63 +.31	56.8 -1.5
Nov. 4.7	45.59 .35	13.3 2.3	57.48 .29	4.6 0.8	45.72 .28	33.9 1.8	42.93 .30	58.5 2.0
14.6	45.92 .31	16.1 2.9	57.77 .28	3.8 0.8	45.98 .26	35.9 2.1	43.22 .28	60.7 2.4
24.6	46.20 .25	19.2 3.3	58.04 .25	3.0 0.8	46.23 .23	38.1 2.3	43.49 .25	63.2 2.7
Dec. 4.6	46.42 .20	22.6 3.5	58.27 .22	2.2 0.8	46.45 .20	40.6 2.5	43.72 .22	66.1 2.9
14.5	46.59 +.13	26.2 -3.6	58.48 +.18	1.5 -0.7	46.64 +.17	43.1 -2.5	43.92 +.18	69.1 -3.0
24.5	46.68 +.06	29.8 3.6	58.64 .14	0.8 0.6	46.78 .12	45.7 2.5	44.08 .13	72.1 3.1
34.5	46.71 -.01	33.4 -3.5	58.76 +.09	0.3 -0.5	46.88 +.08	48.2 -2.4	44.18 +.08	75.2 -3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Canis Majoris.		$\delta$ Geminorum.		Piazzii vii, 67.		$\alpha^a$ Geminorum. (Castor.)	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 7 4	° ' -26 13	h m 7 14	° ' +22 9	h m 7 20	° ' +68 39	h m 7 28	° ' +32 6
	s	"	s	"	s	"	s	"
(Dec. 30.5)	19.40 +.11	58.9 -3.0	8.20 +.17	61.9 -0.3	28.54 +.33	73.6 +2.3	12.38 +.19	31.6 +0.2
Jan. 9.5	19.49 .06	61.9 2.8	8.34 .11	61.6 -0.2	28.80 .21	76.0 2.4	12.55 .14	31.9 0.4
19.5	19.53 +.01	64.6 2.6	8.43 .06	61.5 0.0	28.95 +.08	78.4 2.5	12.66 .08	32.4 0.6
29.5	19.51 -.04	67.2 2.4	8.47 +.01	61.5 +0.1	28.97 -.04	80.9 2.4	12.71 +.02	33.0 0.7
Feb. 8.4	19.44 .09	69.4 2.1	8.45 -.04	61.6 0.2	28.86 .16	83.3 2.3	12.70 -.04	33.7 0.7
18.4	19.33 -.13	71.4 -1.7	8.38 -.09	61.8 +0.2	28.63 -.27	85.5 +2.1	12.64 -.09	34.4 +0.7
28.4	19.18 .16	73.0 1.4	8.27 .13	62.1 0.3	28.30 .36	87.5 1.8	12.52 .13	35.1 0.7
Mar. 10.3	19.00 .19	74.1 1.0	8.13 .15	62.4 0.2	27.89 .43	89.0 1.4	12.38 .16	35.7 0.6
20.3	18.80 .20	74.9 0.6	7.96 .17	62.6 0.2	27.42 .48	90.2 0.9	12.20 .18	36.3 0.5
30.3	18.59 .21	75.3 -0.2	7.78 .18	62.8 0.2	26.91 .51	90.8 +0.4	12.01 .20	36.7 0.3
Apr. 9.3	18.39 -.20	75.4 +0.2	7.60 -.17	62.9 +0.1	26.39 -.50	91.0 -0.1	11.81 -.19	37.0 +0.2
19.2	18.19 .19	75.0 0.5	7.43 .16	63.0 +0.1	25.89 .48	90.7 0.6	11.62 .18	37.0 0.0
29.2	18.01 .17	74.3 0.9	7.28 .14	63.1 0.0	25.42 .43	89.9 1.0	11.45 .16	37.0 -0.2
May 9.2	17.86 .14	73.2 1.2	7.16 .11	63.0 -0.1	25.01 .37	88.7 1.4	11.30 .13	36.7 0.3
19.1	17.73 .11	71.8 1.5	7.07 .07	62.9 0.1	24.68 .29	87.1 1.8	11.19 .09	36.3 0.4
29.1	17.65 -.07	70.1 +1.8	7.01 -.04	62.8 -0.1	24.43 -.20	85.1 -2.1	11.12 -.05	35.8 -0.6
June 8.1	17.60 -.03	68.2 2.0	6.99 .00	62.7 0.2	24.27 .11	82.9 2.3	11.08 -.01	35.2 0.6
18.1	17.59 +.01	66.0 2.2	7.02 +.04	62.5 0.2	24.21 -.01	80.5 2.5	11.09 +.03	34.5 0.7
28.0	17.62 .05	63.7 2.3	7.08 .08	62.3 0.2	24.25 +.09	77.9 2.6	11.15 .07	33.8 0.8
July 8.0	17.69 .09	61.4 2.4	7.18 .12	62.2 0.2	24.39 .19	75.2 2.7	11.24 .11	33.0 0.8
18.0	17.80 +.13	59.0 +2.3	7.31 +.15	62.0 -0.2	24.63 +.28	72.6 -2.6	11.37 +.15	32.2 -0.8
28.0	17.94 .16	56.7 2.2	7.48 .18	61.8 0.2	24.95 .37	69.9 2.6	11.54 .18	31.4 0.9
Aug. 6.9	18.12 .19	54.6 2.0	7.68 .21	61.5 0.3	25.36 .45	67.4 2.5	11.74 .21	30.5 0.9
16.9	18.32 .22	52.7 1.8	7.90 .24	61.2 0.3	25.85 .52	65.0 2.3	11.96 .24	29.6 0.9
26.9	18.56 .24	51.1 1.5	8.15 .26	60.8 0.4	26.40 .58	62.8 2.1	12.22 .27	28.7 0.9
Sept. 5.9	18.81 +.26	49.8 +1.1	8.42 +.28	60.4 -0.5	27.02 +.64	60.9 -1.8	12.50 +.29	27.8 -0.9
15.8	19.09 .28	49.0 0.6	8.70 .29	59.9 0.6	27.68 .68	59.2 1.5	12.80 .31	26.9 0.9
25.8	19.38 .30	48.7 +0.1	9.00 .31	59.3 0.6	28.38 .72	57.8 1.2	13.12 .33	26.0 0.9
Oct. 5.8	19.68 .31	48.9 -0.4	9.32 .32	58.6 0.7	29.12 .74	56.8 0.9	13.46 .34	25.1 0.9
15.7	19.99 .31	49.6 0.9	9.64 .32	57.9 0.8	29.87 .76	56.1 0.5	13.81 .35	24.2 0.8
25.7	20.30 +.31	50.8 -1.4	9.96 +.32	57.1 -0.8	30.63 +.76	55.8 -0.1	14.16 +.36	23.4 -0.8
Nov. 4.7	20.61 .30	52.5 1.9	10.29 .32	56.2 0.8	31.38 .74	55.9 +0.3	14.52 .35	22.6 0.7
14.7	20.90 .28	54.6 2.3	10.61 .31	55.4 0.8	32.11 .71	56.4 0.7	14.87 .34	21.9 0.6
24.6	21.17 .26	57.0 2.6	10.91 .29	54.6 0.8	32.79 .66	57.3 1.1	15.21 .32	21.4 0.4
Dec. 4.6	21.42 .23	59.7 2.8	11.19 .27	53.8 0.7	33.42 .59	58.7 1.5	15.52 .30	21.1 0.3
14.6	21.63 +.19	62.6 -2.9	11.44 +.23	53.2 -0.6	33.97 +.50	60.4 +1.8	15.80 +.26	20.9 -0.1
24.6	21.79 .14	65.6 3.0	11.66 .19	52.7 0.4	34.42 .40	62.4 2.1	16.05 .22	20.9 +0.1
34.5	21.91 +.09	68.6 -2.9	11.82 +.14	52.4 -0.2	34.76 +.28	64.6 +2.3	16.24 +.17	21.2 +0.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Canis Minoris. (Procyon.)		$\beta$ Geminorum. (Pollux.)		$\phi$ Geminorum.		3 Ursæ Majoris (H.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 7 34	° ' " + 5 28	h m 7 39	° ' " +28 15	h m 7 47	° ' " +27 1	h m 8 2	° ' " +68 45
	s	"	s	"	s	"	s	"
(Dec. 30.5)	3.40 +.17	57.3 -1.3	10.99 +.20	66.6 -0.1	21.78 +.20	31.9 -0.2	51.87 +.43	66.5 +2.2
Jan. 9.5	3.54 .12	55.9 1.3	11.16 .14	66.6 +0.1	21.96 .15	31.9 0.0	52.25 .31	68.6 2.3
19.5	3.64 .07	54.7 1.1	11.28 .09	66.8 0.3	22.08 .10	32.0 +0.2	52.50 +.19	71.0 2.4
29.5	3.68 +.02	53.7 0.9	11.34 +.03	67.2 0.4	22.15 +.04	32.3 0.3	52.62 +.06	73.5 2.5
Feb. 8.4	3.67 -0.03	52.8 0.8	11.35 -0.02	67.7 0.5	22.17 -0.01	32.7 0.5	52.62 -0.07	76.0 2.5
18.4	3.62 -0.07	52.1 -0.6	11.30 -0.07	68.2 +0.6	22.13 -0.06	33.2 +0.5	52.49 -0.19	78.4 +2.4
28.4	3.53 .11	51.6 0.4	11.20 .12	68.8 0.6	22.04 .11	33.7 0.5	52.24 .29	80.7 2.1
Mar. 10.3	3.40 .14	51.3 0.3	11.06 .15	69.4 0.5	21.91 .14	34.3 0.5	51.90 .38	82.7 1.8
20.3	3.25 .16	51.1 -0.1	10.90 .17	69.9 0.5	21.75 .17	34.8 0.5	51.48 .45	84.3 1.4
30.3	3.09 .17	51.0 0.0	10.72 .18	70.3 0.4	21.58 .18	35.2 0.4	51.00 .49	85.5 0.9
Apr. 9.3	2.92 -0.16	51.1 +0.1	10.53 -0.18	70.6 +0.2	21.40 -0.18	35.6 +0.3	50.49 -0.51	86.2 +0.5
19.2	2.76 .15	51.3 0.2	10.35 .18	70.8 +0.1	21.22 .17	35.8 +0.1	49.98 .50	86.4 0.0
29.2	2.61 .14	51.5 0.3	10.18 .16	70.8 0.0	21.05 .15	35.9 0.0	49.48 .48	86.1 -0.5
May 9.2	2.48 .11	51.9 0.4	10.03 .13	70.7 -0.1	20.91 .13	35.9 -0.1	49.03 .43	85.4 1.0
19.2	2.38 .08	52.3 0.5	9.92 .10	70.5 0.3	20.79 .10	35.7 0.2	48.62 .37	84.2 1.4
June 29.1	2.32 -0.05	52.8 +0.6	9.84 -0.06	70.2 -0.4	20.71 -0.06	35.5 -0.3	48.29 -0.29	82.6 -1.8
8.1	2.28 -0.02	53.4 0.6	9.80 -0.02	69.8 0.4	20.66 -0.03	35.1 0.4	48.04 .21	80.6 2.1
18.1	2.28 +0.02	54.1 0.7	9.80 +0.02	69.3 0.5	20.66 +0.01	34.7 0.4	47.88 .11	78.4 2.4
28.0	2.32 .05	54.8 0.7	9.84 .06	68.8 0.6	20.69 .05	34.3 0.5	47.81 -0.02	75.9 2.6
July 8.0	2.38 .08	55.5 0.7	9.91 .10	68.2 0.6	20.76 .09	33.8 0.5	47.84 +0.08	73.2 2.7
18.0	2.48 +.12	56.2 +0.7	10.03 +.13	67.6 -0.6	20.86 +.12	33.2 -0.6	47.96 +.17	70.5 -2.8
28.0	2.62 .15	56.8 0.6	10.18 .16	66.9 0.7	21.00 .16	32.6 0.6	48.17 .26	67.7 2.8
Aug. 6.9	2.78 .17	57.4 0.5	10.36 .19	66.2 0.7	21.17 .19	31.9 0.7	48.48 .34	64.9 2.8
16.9	2.96 .20	57.8 0.4	10.56 .22	65.5 0.8	21.37 .21	31.2 0.8	48.86 .42	62.2 2.7
26.9	3.17 .22	58.1 +0.2	10.80 .25	64.7 0.8	21.60 .24	30.4 0.8	49.32 .49	59.6 2.5
Sept. 5.9	3.40 +.24	58.2 0.0	11.06 +.27	63.8 -0.9	21.85 +.26	29.6 -0.9	49.85 +.56	57.1 -2.3
15.8	3.65 .26	58.1 -0.2	11.34 .29	63.0 0.9	22.13 .29	28.7 0.9	50.44 .62	54.9 2.1
25.8	3.92 .28	57.8 0.5	11.64 .31	62.0 0.9	22.42 .31	27.7 1.0	51.09 .67	52.9 1.8
Oct. 5.8	4.21 .29	57.2 0.7	11.96 .33	61.1 1.0	22.74 .32	26.7 1.0	51.78 .71	51.3 1.5
15.7	4.50 .30	56.3 1.0	12.30 .34	60.1 1.0	23.07 .33	25.7 1.0	52.51 .74	49.9 1.1
25.7	4.80 +.30	55.2 -1.2	12.64 +.34	59.2 -0.9	23.40 +.34	24.7 -1.0	53.26 +.76	49.0 -0.8
Nov. 4.7	5.10 .30	54.0 1.4	12.98 .34	58.2 0.9	23.75 .34	23.7 1.0	54.02 .76	48.4 -0.3
14.7	5.41 .29	52.5 1.5	13.32 .34	57.4 0.8	24.09 .34	22.7 0.9	54.77 .74	48.4 +0.1
24.6	5.69 .28	51.0 1.6	13.65 .32	56.6 0.7	24.42 .32	21.9 0.8	55.50 .71	48.7 0.6
Dec. 4.6	5.96 .26	49.4 1.6	13.97 .30	56.0 0.5	24.73 .30	21.2 0.6	56.19 .65	49.5 1.0
14.6	6.21 +.23	47.8 -1.6	14.25 +.26	55.6 -0.3	25.02 +.27	20.6 -0.5	56.81 +.58	50.7 +1.4
24.6	6.42 .19	46.2 1.5	14.49 .22	55.3 -0.2	25.27 .23	20.2 0.3	57.35 .49	52.3 1.8
34.5	6.58 +.15	44.8 -1.4	14.69 +.17	55.3 0.0	25.48 +.18	20.0 -0.1	57.79 +.38	54.3 +2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	15 Argûs ( $\rho$ ).		$\eta$ Cancrî.		$\epsilon$ Hydræ.		$\iota$ Ursæ Majoris.		
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	
	h m 8 3	° ' -24 0	h m 8 26	° ' +20 46	h m 8 41	° ' + 6 46	h m 8 52	° ' +48 25	
	s	"	s	"	s	"	s	"	
(Dec. 30.6)	16.81 +.18	48.1 -4.9	54.70 +.23	55.2 -0.7	27.98 +.23	75.3 -1.5	20.83 +.33	63.9 +0.6	
Jan. 9.5	16.97 .13	51.0 2.9	54.91 .19	54.6 0.5	28.19 .19	73.8 1.4	21.14 .27	64.7 1.0	
19.5	17.07 .08	53.9 2.8	55.07 .14	54.2 0.3	28.35 .14	72.5 1.2	21.38 .20	65.8 1.3	
29.5	17.12 +.02	56.6 2.6	55.17 .08	54.0 -0.1	28.46 .09	71.4 1.0	21.54 .13	67.2 1.5	
Feb. 8.5	17.12 -.03	59.1 2.3	55.23 +.03	54.0 +0.1	28.52 +.04	70.5 0.8	21.64 +.06	68.8 1.7	
	18.4	17.07 -.07	61.3 -2.0	55.23 -.02	54.2 +0.3	28.53 -.01	69.8 -0.6	21.66 -.02	70.5 +1.7
	28.4	16.97 .11	63.1 1.7	55.18 .07	54.5 0.4	28.50 .06	69.4 0.4	21.61 .08	72.3 1.7
Mar. 10.4	16.84 .15	64.7 1.3	55.09 .11	54.9 0.4	28.42 .09	69.1 -0.2	21.49 .14	74.0 1.6	
20.4	16.67 .17	65.8 1.0	54.96 .14	55.3 0.4	28.31 .12	69.0 0.0	21.33 .18	75.5 1.5	
30.3	16.49 .18	66.6 0.6	54.82 .15	55.8 0.4	28.18 .14	69.0 +0.1	21.13 .22	76.9 1.2	
Apr. 9.3	16.30 -.19	67.1 -0.3	54.65 -.16	56.2 +0.4	28.04 -.15	69.2 +0.2	20.89 -.24	78.0 +0.9	
19.3	16.12 .18	67.2 +0.1	54.49 .16	56.6 0.4	27.89 .15	69.4 0.3	20.65 .24	78.8 0.6	
29.3	15.94 .17	66.9 0.5	54.33 .15	56.9 0.3	27.74 .14	69.7 0.3	20.40 .24	79.3 +0.3	
May 9.2	15.77 .15	66.3 0.8	54.19 .14	57.2 0.2	27.60 .13	70.1 0.4	20.17 .22	79.4 -0.1	
19.2	15.63 .13	65.3 1.1	54.06 .11	57.3 0.1	27.48 .11	70.5 0.4	19.95 .20	79.1 0.4	
	29.2	15.52 -.10	64.1 +1.4	53.96 -.08	57.4 +0.1	27.38 -.09	71.0 +0.5	19.77 -.17	78.6 -0.7
June 8.1	15.44 .07	62.6 1.6	53.89 .05	57.4 0.0	27.31 .06	71.5 0.5	19.62 .13	77.7 1.0	
18.1	15.38 -.04	60.8 1.8	53.85 -.02	57.4 -0.1	27.26 -.03	72.0 0.5	19.52 .08	76.5 1.3	
28.1	15.36 .00	58.9 2.0	53.85 +.01	57.3 0.2	27.24 .00	72.6 0.5	19.47 -.04	75.1 1.5	
July 8.1	15.38 +.03	56.9 2.1	53.88 .04	57.1 0.2	27.25 +.03	73.1 0.5	19.44 +.01	73.5 1.7	
	18.0	15.43 +.07	54.8 +2.1	53.94 +.08	56.8 -0.3	27.29 +.06	73.6 +0.5	19.47 +.05	71.7 -1.9
	28.0	15.52 .10	52.7 2.1	54.03 .11	56.4 0.4	27.36 .09	74.0 0.4	19.54 .10	69.8 2.0
Aug. 7.0	15.64 .13	50.6 2.0	54.15 .14	56.0 0.5	27.46 .11	74.4 0.3	19.66 .14	67.7 2.1	
17.0	15.79 .17	48.7 1.8	54.31 .17	55.5 0.6	27.59 .14	74.6 +0.2	19.82 .18	65.6 2.2	
26.9	15.97 .20	47.1 1.5	54.49 .19	54.8 0.7	27.74 .17	74.7 0.0	20.03 .22	63.4 2.2	
Sept. 5.9	16.18 +.22	45.7 +1.2	54.69 +.22	54.0 -0.8	27.92 +.19	74.6 -0.2	20.27 +.26	61.2 -2.2	
15.9	16.42 .25	44.8 0.8	54.93 .25	53.1 1.0	28.13 .22	74.3 0.4	20.55 .30	59.0 2.2	
25.8	16.68 .27	44.2 +0.3	55.19 .27	52.1 1.1	28.36 .24	73.7 0.7	20.87 .34	56.9 2.1	
Oct. 5.8	16.96 .29	44.2 -0.2	55.47 .29	51.0 1.2	28.62 .27	73.0 0.9	21.23 .37	54.9 1.9	
15.8	17.27 .31	44.6 0.7	55.77 .31	49.8 1.3	28.90 .29	72.0 1.1	21.62 .40	53.0 1.8	
	25.8	17.58 +.32	45.5 -1.2	56.09 +.32	48.5 -1.3	29.19 +.30	70.7 -1.3	22.03 +.42	51.3 -1.6
Nov. 4.7	17.90 .32	46.9 1.6	56.41 .33	47.1 1.4	29.50 .31	69.3 1.5	22.46 .44	49.8 1.3	
14.7	18.21 .31	48.7 2.0	56.75 .33	45.7 1.3	29.82 .32	67.7 1.6	22.91 .45	48.6 1.0	
24.7	18.52 .30	51.0 2.4	57.08 .33	44.4 1.3	30.13 .31	66.0 1.7	23.35 .44	47.7 0.7	
Dec. 4.7	18.81 .28	53.5 2.7	57.40 .31	43.2 1.2	30.44 .30	64.3 1.7	23.79 .43	47.2 -0.5	
	14.6	19.07 +.24	56.3 -2.8	57.70 +.29	42.1 -1.0	30.73 +.28	62.5 -1.7	24.21 +.40	47.1 0.0
	24.6	19.29 .20	59.2 2.9	57.98 .25	41.1 0.8	31.00 .25	60.8 1.6	24.59 .35	47.3 +0.4
	34.6	19.48 +.16	62.1 -3.0	58.21 +.22	40.4 -0.6	31.23 +.21	59.3 -1.5	24.92 +.31	47.9 +0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\sigma^2$ Ursæ Majoris.		$\kappa$ Cancrî.		$\epsilon$ Argûs.		$\alpha$ Hydræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 9 1	° ' " +67 32	h m 9 2	° ' " +11 4	h m 9 14	° ' " -58 50	h m 9 22	° ' " -8 13
(Dec. 30.6)	35.46 +.53	25.0 +1.4	18.94 +.25	21.1 -1.4	25.49 +.33	57.8 -3.7	39.51 +.25	19.2 -2.4
Jan. 9.6	35.94 .43	26.7 1.8	19.17 .21	19.8 1.2	25.78 .25	61.5 3.8	39.74 .21	21.5 2.3
	19.6	36.32 .32	19.35 .16	18.7 1.0	25.99 .17	65.3 3.9	39.93 .17	23.7 2.1
	29.5	36.58 .20	19.49 .11	17.8 0.8	26.12 +.09	69.2 3.8	40.07 .12	25.8 2.0
Feb. 8.5	36.72 +.08	33.5 2.5	19.57 .06	17.1 0.5	26.16 .00	73.0 3.7	40.17 .07	27.6 1.8
	18.5	36.74 -.04	19.60 +.01	16.7 -0.3	26.12 -.08	76.7 -3.5	40.21 +.02	29.3 -1.5
	28.4	36.63 .16	19.59 -.04	16.5 -0.1	26.01 .15	80.1 3.3	40.21 -.02	30.6 1.2
Mar. 10.4	36.42 .26	40.9 2.3	19.53 .07	16.4 0.0	25.82 .21	83.3 3.0	40.17 .06	31.7 1.0
	20.4	36.12 .34	19.44 .11	16.5 +0.2	25.58 .26	86.1 2.6	40.09 .09	32.6 0.7
	30.4	35.74 .40	19.32 .13	16.8 0.3	25.30 .30	88.5 2.1	39.98 .12	33.2 0.5
Apr. 9.3	35.31 -.45	46.3 +1.2	19.18 -.14	17.1 +0.3	24.98 -.33	90.4 -1.7	39.85 -.13	33.6 -0.3
	19.3	34.85 .47	19.03 .15	17.4 0.4	24.63 .35	91.8 1.2	39.72 .14	33.7 0.0
	29.3	34.38 .47	18.89 .14	17.8 0.4	24.27 .36	92.8 0.7	39.57 .14	33.6 +0.2
May 9.3	33.92 .45	47.7 -0.3	18.75 .13	18.2 0.4	23.92 .35	93.2 -0.2	39.43 .13	33.3 0.4
	19.2	33.48 .41	18.63 .12	18.6 0.4	23.57 .34	93.1 +0.3	39.31 .12	32.9 0.6
	29.2	33.09 -.36	18.52 -.09	19.0 +0.4	23.24 -.32	92.5 +0.8	39.19 -.11	32.2 +0.7
June 8.2	32.76 .30	44.8 1.6	18.44 .07	19.4 0.4	22.93 .29	91.4 1.3	39.09 .09	31.4 0.9
	18.1	32.49 .23	18.37 .04	19.8 0.3	22.66 .25	89.9 1.7	39.02 .06	30.5 1.0
	28.1	32.30 .15	18.35 -.02	20.1 0.3	22.44 .20	87.9 2.1	38.97 .04	29.5 1.1
July 8.1	32.19 -.07	38.5 2.5	18.34 +.01	20.4 0.3	22.26 .15	85.6 2.5	38.94 -.02	28.3 1.1
	18.1	32.16 +.01	18.37 +.04	20.6 +0.2	22.13 -.10	83.0 +2.7	38.94 +.01	27.2 +1.2
	28.0	32.21 .09	18.42 .07	20.8 +0.1	22.06 -.04	80.2 2.9	38.96 .04	26.0 1.1
Aug. 7.0	32.34 .18	30.1 3.0	18.50 .10	20.8 0.0	22.06 +.03	77.3 2.9	39.01 .07	24.9 1.1
	17.0	32.56 .25	18.61 .12	20.8 -0.1	22.12 .09	74.3 2.9	39.09 .10	23.9 0.9
	27.0	32.85 .33	18.75 .15	20.6 0.3	22.24 .16	71.4 2.8	39.20 .12	23.1 0.8
Sept. 5.9	33.22 +.40	21.1 -2.9	18.91 +.18	20.2 -0.5	22.44 +.23	68.8 +2.5	39.34 +.15	22.4 +0.5
	15.9	33.65 .47	18.3 2.7	19.11 .21	22.70 .29	66.4 2.2	39.51 .18	22.0 +0.2
	25.9	34.16 .53	15.6 2.5	19.33 .23	23.02 .35	64.4 1.7	39.71 .21	21.9 -0.1
Oct. 5.8	34.72 .59	13.2 2.3	19.58 .26	17.9 1.1	23.40 .41	62.9 1.2	39.94 .24	22.2 0.4
	15.8	35.34 .64	11.1 2.0	19.84 .28	23.83 .45	62.0 +0.6	40.19 .27	22.8 0.8
	25.8	36.01 +.68	9.3 -1.6	20.14 +.30	24.30 +.48	61.7 0.0	40.47 +.29	23.7 -1.1
Nov. 4.8	36.70 .70	7.8 1.2	20.45 .31	13.8 1.6	24.80 .50	62.0 -0.7	40.77 .31	25.0 1.5
	14.7	37.42 .72	20.77 .32	12.2 1.7	25.30 .50	63.0 1.3	41.09 .32	26.6 1.8
	24.7	38.13 .71	21.09 .32	10.5 1.7	25.81 .49	64.6 1.9	41.41 .32	28.5 2.0
Dec. 4.7	38.83 .68	6.3 +0.2	21.41 .31	8.8 1.7	26.29 .47	66.8 2.5	41.73 .31	30.6 2.2
	14.7	39.50 +.63	6.7 +0.7	21.72 +.30	26.74 +.42	69.6 -2.9	42.03 +.30	32.8 -2.5
	24.6	40.11 .57	7.7 1.2	22.00 .27	27.13 .36	72.7 3.3	42.32 .27	35.2 2.3
	34.6	40.64 +.49	9.1 +1.6	22.26 +.24	27.46 +.30	76.2 -3.6	42.57 +.23	37.5 2.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Draconis (H.)		♉ Ursæ Majoris.		♊ Ursæ Majoris.		♋ Leonis.		
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	
	h m 9 22	° ' +81 45	h m 9 25	° ' +70 15	h m 9 26	° ' +52 7	h m 9 40	° ' +24 13	
	s	"	s	"	s	"	s	"	
(Dec. 30.6)	52.91+1.32	64.1+1.8	38.23+.63	68.8+1.4	9.27+.39	58.6+.3	9.40+.30	68.9-1.0	
Jan. 9.6	54.12 1.07	66.0 2.2	38.80 .52	70.3 1.8	9.63 .33	59.3 0.9	9.68 .26	68.1 0.6	
19.6	55.08 .81	68.4 2.5	39.27 .41	72.3 2.1	9.92 .26	60.4 1.3	9.91 .21	67.6 0.3	
29.5	55.76 .52	71.1 2.8	39.62 .28	74.6 2.4	10.14 .18	61.9 1.6	10.10 .16	67.4 -0.1	
Feb. 8.5	56.13+.22	74.0 3.0	39.83 .14	77.1 2.6	10.29 .11	63.6 1.8	10.23 .10	67.5+.2	
	18.5	56.19-.08	77.0+3.0	39.91+.01	79.8+2.7	10.36+.03	65.5+1.9	10.30+.05	67.8+.4
	28.4	55.95 .38	80.0 2.9	39.84 -.12	82.5 2.6	10.35 -.05	67.5 2.0	10.32 .00	68.4 0.6
Mar. 10.4	55.41 .65	82.8 2.6	39.66 .24	85.0 2.5	10.27 .11	69.5 1.9	10.30 -.05	69.1 0.8	
20.4	54.62 .89	85.3 2.3	39.36 .34	87.4 2.2	10.12 .17	71.4 1.8	10.23 .09	69.9 0.8	
30.4	53.61 1.08	87.4 1.9	38.97 .43	89.5 1.9	9.93 .21	73.1 1.6	10.13 .12	70.7 0.8	
Apr. 9.3	52.43-1.22	89.1+1.4	38.51 -.49	91.2+1.5	9.70 -.24	74.5+1.3	10.00 -.14	71.6+.8	
19.3	51.13 1.31	90.3 0.9	38.00 .52	92.4 1.0	9.45 .26	75.7 1.0	9.86 .15	72.4 0.7	
29.3	49.76 1.36	90.9+.3	37.46 .54	93.2+.5	9.18 .26	76.5 0.6	9.71 .15	73.1 0.6	
May 9.3	48.39 1.34	91.0-.2	36.92 .53	93.4 0.0	8.92 .26	76.9+.2	9.56 .15	73.7 0.5	
19.2	47.05 1.28	90.5 0.8	36.41 .50	93.2-.5	8.67 .24	76.9-.2	9.42 .14	74.1 0.4	
	29.2	45.79-1.18	89.4-1.3	35.93 -.45	92.4-1.0	8.44 -.21	76.6-.5	9.29 -.12	74.4+.2
June 8.2	44.66 1.05	87.8 1.8	35.50 .39	91.2 1.4	8.24 .18	75.9 0.9	9.18 .10	74.5+.1	
18.1	43.68 .88	85.8 2.2	35.14 .32	89.5 1.9	8.09 .14	74.8 1.2	9.09 .07	74.5-.1	
28.1	42.89 .69	83.4 2.6	34.85 .24	87.5 2.2	7.97 .10	73.4 1.5	9.03 .05	74.4 0.2	
July 8.1	42.29 .49	80.6 2.9	34.65 .16	85.1 2.5	7.90 .05	71.7 1.8	8.99 -.02	74.1 0.4	
	18.1	41.92-.27	77.5-3.2	34.53 -.07	82.4-2.8	7.87 -.01	69.8-2.0	8.98+.01	73.6-.5
	28.0	41.76-.04	74.2 3.3	34.51+.02	79.5 3.0	7.88+.04	67.7 2.2	9.00 .03	73.0 0.7
Aug. 7.0	41.83+.19	70.8 3.4	34.58 .11	76.5 3.1	7.95 .09	65.4 2.4	9.05 .06	72.2 0.8	
17.0	42.13 .41	67.3 3.5	34.73 .20	73.4 3.2	8.06 .14	63.0 2.5	9.13 .09	71.3 1.0	
27.0	42.65 .63	63.9 3.4	34.98 .29	70.2 3.2	8.22 .18	60.5 2.5	9.23 .12	70.2 1.1	
Sept. 5.9	43.39+.85	60.5-3.3	35.32+.38	67.0-3.1	8.43+.23	57.9-2.6	9.37+.15	69.0-1.3	
15.9	44.33 1.05	57.2 3.2	35.74 .46	63.9 3.0	8.68 .27	55.4 2.5	9.54 .19	67.6 1.4	
25.9	45.46 1.21	54.2 2.9	36.25 .54	61.0 2.8	8.98 .32	52.9 2.5	9.74 .22	66.1 1.6	
Oct. 5.8	46.76 1.37	51.4 2.6	36.82 .61	58.3 2.6	9.31 .36	50.4 2.4	9.98 .25	64.5 1.7	
15.8	48.22 1.51	49.0 2.2	37.47 .68	55.8 2.3	9.69 .40	48.1 2.2	10.24 .28	62.8 1.8	
	25.8	49.80+1.62	46.9-1.8	38.17+.73	53.7-1.9	10.10+.43	46.0-2.0	10.53+.30	61.0-1.8
Nov. 4.8	51.48 1.70	45.3 1.3	38.92 .77	51.9 1.5	10.55 .45	44.1 1.7	10.85 .32	59.1 1.8	
14.7	53.21 1.73	44.3 0.8	39.71 .79	50.6 1.1	11.01 .47	42.6 1.4	11.18 .34	57.3 1.8	
24.7	54.97 1.73	43.7-0.3	40.50 .79	49.8-0.6	11.49 .47	41.4 1.0	11.53 .35	55.6 1.7	
Dec. 4.7	56.69 1.67	43.8+.2	41.29 .77	49.5 0.0	11.96 .47	40.5 0.6	11.88 .35	54.0 1.5	
	14.7	58.34+1.57	44.4+0.9	42.05+.73	49.7+.5	12.42+.44	40.1-.2	12.22+.33	52.5-1.3
	24.6	59.86 1.41	45.5 1.4	42.76 .67	50.5 1.0	12.85 .40	40.1+.3	12.55 .31	51.3 1.1
	34.6	61.19+1.23	47.2+2.0	43.39+.59	51.8+1.5	13.24+.36	40.6+.7	12.84+.28	50.3-.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date	$\mu$ Leonis.		$\alpha$ Leonis. (Regulus.)		32 Ursæ Majoris.		$\gamma^1$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 9 47	° ' " +26 28	h m 10 3	° ' " +12 27	h m 10 10	° ' " +65 36	h m 10 14	° ' " +20 20
	"	"	"	"	"	"	"	"
(Dec. 30.6)	3.47 +.31	44.4 -0.9	1.62 +.29	28.6 -1.6	45.78 +.58	22.0 +0.6	26.30 +.31	56.0 -1.3
Jan. 9.6	3.75 .26	43.7 0.6	1.89 .26	27.1 1.4	46.33 .51	22.9 1.1	26.59 .28	54.9 1.0
19.6	3.99 .22	43.3 -0.2	2.13 .22	25.9 1.1	46.81 .43	24.2 1.6	26.85 .24	54.0 0.7
29.6	4.19 .17	43.2 +0.1	2.32 .17	24.9 0.8	47.20 .33	26.0 2.0	27.06 .19	53.4 0.4
Feb. 8.5	4.33 .11	43.4 0.3	2.47 .12	24.2 0.6	47.48 .23	28.2 2.3	27.23 .14	53.2 -0.1
18.5	4.41 +.06	43.8 +0.6	2.56 +.07	23.8 -0.3	47.65 +.12	30.7 +2.5	27.34 +.08	53.2 +0.2
28.5	4.44 .00	44.5 0.8	2.61 +.02	23.6 -0.1	47.71 +.01	33.3 2.6	27.40 +.04	53.5 0.4
Mar. 10.5	4.42 -0.05	45.4 0.9	2.60 -0.02	23.6 +0.1	47.67 -0.09	35.9 2.6	27.41 -0.01	54.0 0.6
20.4	4.36 .08	46.3 0.9	2.56 .06	23.9 0.3	47.52 .18	38.4 2.5	27.37 .05	54.7 0.7
30.4	4.26 .11	47.2 1.0	2.49 .09	24.2 0.4	47.29 .26	40.8 2.2	27.30 .08	55.4 0.8
Apr. 9.4	4.13 -.13	48.2 +0.9	2.39 -.11	24.7 +0.5	46.98 -.33	42.9 +1.9	27.21 -.11	56.3 +0.8
19.3	3.99 .15	49.1 0.8	2.27 .12	25.2 0.5	46.62 .37	44.6 1.6	27.09 .12	57.1 0.8
29.3	3.84 .15	49.8 0.7	2.14 .13	25.8 0.6	46.23 .40	45.9 1.1	26.96 .13	57.9 0.7
May 9.3	3.69 .15	50.5 0.6	2.01 .13	26.3 0.6	45.81 .41	46.8 0.6	26.83 .13	58.6 0.6
19.3	3.54 .14	51.0 0.4	1.89 .12	26.9 0.5	45.40 .41	47.2 +0.1	26.69 .13	59.2 0.6
June 29.2	3.41 -.13	51.3 +0.2	1.77 -.11	27.4 +0.5	45.00 -.39	47.1 -0.4	26.57 -.12	59.7 +0.4
8.2	3.29 .11	51.4 0.0	1.66 .10	27.8 0.4	44.62 .36	46.5 0.8	26.46 .11	60.1 0.3
18.2	3.20 .08	51.3 -0.1	1.58 .08	28.2 0.4	44.28 .31	45.4 1.3	26.36 .09	60.3 +0.1
28.2	3.13 .06	51.1 0.3	1.50 .06	28.5 0.3	43.99 .26	43.9 1.7	26.28 .07	60.4 0.0
July 8.1	3.08 -.03	50.7 0.5	1.46 .04	28.8 0.2	43.75 .20	42.0 2.1	26.22 .05	60.3 -0.1
18.1	3.06 .00	50.1 -0.7	1.43 -.01	28.9 +0.1	43.58 -.14	39.8 -2.4	26.18 -.02	60.1 -0.3
28.1	3.08 +.03	49.4 0.8	1.43 +.01	28.9 0.0	43.47 .07	37.2 2.7	26.17 .00	59.7 0.5
Aug. 7.0	3.12 .06	48.5 1.0	1.45 .04	28.8 -0.2	43.43 -.01	34.4 2.9	26.18 +.03	59.1 0.6
17.0	3.19 .09	47.4 1.1	1.50 .06	28.6 0.3	43.45 +.06	31.4 3.1	26.22 .05	58.4 0.8
27.0	3.29 .12	46.2 1.3	1.58 .09	28.2 0.5	43.55 .13	28.2 3.2	26.29 .08	57.5 1.0
Sept. 6.0	3.42 +.15	44.8 -1.4	1.68 +.12	27.6 -0.7	43.72 +.21	25.0 -3.2	26.39 +.11	56.4 -1.2
15.9	3.58 .18	43.3 1.6	1.82 .15	26.8 0.9	43.97 .28	21.8 3.2	26.52 .15	55.2 1.3
25.9	3.78 .21	41.7 1.7	1.99 .18	25.8 1.1	44.28 .35	18.6 3.1	26.68 .18	53.7 1.5
Oct. 5.9	4.01 .25	39.9 1.8	2.19 .22	24.6 1.3	44.67 .42	15.5 3.0	26.88 .21	52.1 1.7
15.9	4.27 .28	38.1 1.9	2.42 .25	23.2 1.5	45.12 .48	12.6 2.8	27.11 .25	50.4 1.8
25.8	4.56 +.31	36.2 -1.9	2.69 +.28	21.7 -1.7	45.64 +.54	9.9 -2.5	27.38 +.28	48.5 -1.9
Nov. 4.8	4.88 .33	34.3 1.9	2.98 .30	19.9 1.8	46.21 .59	7.5 2.2	27.67 .31	46.6 2.0
14.8	5.22 .34	32.4 1.8	3.29 .32	18.0 1.9	46.82 .63	5.5 1.8	27.99 .33	44.6 2.0
24.7	5.57 .35	30.7 1.7	3.61 .33	16.1 1.9	47.47 .65	4.0 1.3	28.33 .34	42.6 1.9
Dec. 4.7	5.92 .35	29.1 1.5	3.95 .33	14.2 1.9	48.13 .66	2.9 0.8	28.67 .34	40.8 1.8
14.7	6.27 +.34	27.6 -1.3	4.28 +.32	12.4 -1.8	48.78 +.64	2.4 -0.3	29.01 +.34	39.0 -1.7
24.7	6.61 .32	26.4 1.0	4.59 .30	10.6 1.7	49.41 .60	2.4 +0.3	29.35 .32	37.4 1.5
34.6	6.91 +.29	25.5 -0.7	4.88 +.28	9.0 -1.5	50.00 +.56	3.0 +0.8	29.66 +.30	36.0 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 Draconis. (H.)		ρ Leonis.		η Argūs.		ι Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 10 26	<sup>°</sup> <sup>'</sup> +76 13	<sup>h</sup> <sup>m</sup> 10 27	<sup>°</sup> <sup>'</sup> + 9 49	<sup>h</sup> <sup>m</sup> 10 41	<sup>°</sup> <sup>'</sup> -59 9	<sup>h</sup> <sup>m</sup> 10 43	<sup>°</sup> <sup>'</sup> +11 4
(Dec. 30.6)	36.60+ .97	36.4 +0.8	31.50 +.31	24.3 -1.8	10.40 +.46	4.1 -2.9	58.72 +.32	35.5 -1.8
Jan. 9.6	37.52 .85	37.4 1.4	31.79 .27	22.6 1.6	10.84 .40	7.2 3.2	59.02 .28	33.9 1.6
19.6	38.32 .72	39.0 1.9	32.04 .23	21.1 1.3	11.21 .34	10.6 3.5	59.29 .25	32.4 1.3
29.6	38.97 .57	41.1 2.3	32.25 .19	20.0 1.0	11.51 .26	14.2 3.7	59.52 .21	31.2 1.0
Feb. 8.5	39.46 .40	43.6 2.6	32.42 .14	19 1 0.8	11.74 .19	18.0 3.8	59.70 .16	30.4 0.7
18.5	39.77+ .22	46.3 +2.8	32.54 +.09	18.4 -0.5	11.88 +.11	21.8 -3.8	59.84 +.11	29.8 -0.4
28.5	39.89+ .03	49.2 2.9	32.61 +.05	18.0 -0.2	11.95 +.03	25.5 3.7	59.92 .06	29.5 -0.2
Mar. 10.5	39.83- .14	52.1 2.9	32.63 .00	17.9 0.0	11.95 -0.4	29.1 3.5	59.96 +.02	29.4 +0.1
20.4	39.59 .31	55.0 2.7	32.61 -0.3	18.0 +0.2	11.88 .10	32.5 3.2	59.96 -0.02	29.6 0.3
30.4	39.20 .45	57.6 2.5	32.56 .06	18.3 0.3	11.74 .16	35.5 2.9	59.92 .05	29.9 0.4
Apr. 9.4	38.67- .57	60.0 +2.1	32.48 -0.9	18.6 +0.4	11.56 -2.1	38.3 -2.5	59.86 -.08	30.4 +0.5
19.4	38.03 .67	61.9 1.7	32.38 .11	19.1 0.5	11.33 .24	40.6 2.1	59.77 .10	31.0 0.6
29.3	37.31 .73	63.4 1.2	32.27 .12	19.7 0.6	11.07 .27	42.5 1.7	59.66 .11	31.6 0.6
May 9.3	36.55 .76	64.4 0.7	32.15 .12	20.3 0.6	10.78 .30	44.0 1.2	59.55 .12	32.2 0.6
19.3	35.76 .78	64.8 +0.2	32.03 .12	20.8 0.6	10.48 .31	45.0 -0.7	59.43 .12	32.9 0.6
29.3	34.98- .76	64.7 -0.4	31.91 -.11	21.4 +0.5	10.17 -.31	45.5 -0.2	59.31 -.11	33.5 +0.6
June 8.2	34.23 .71	64.0 0.9	31.80 .10	21.9 0.5	9.85 .31	45.4 +0.3	59.20 .10	34.1 0.5
18.2	33.54 .65	62.8 1.4	31.71 .09	22.4 0.5	9.55 .29	44.9 0.8	59.11 .09	34.6 0.4
28.2	32.92 .57	61.2 1.9	31.63 .07	22.9 0.4	9.27 .27	43.9 1.2	59.02 .08	35.0 0.3
July 8.1	32.39 .48	59.1 2.3	31.57 .05	23.2 0.3	9.00 .24	42.5 1.7	58.95 .06	35.3 0.3
18.1	31.96- .37	56.6 -2.7	31.53 -0.3	23.5 +0.2	8.78 -.21	40.6 +2.0	58.89 -.04	35.5 +0.2
28.1	31.65 .25	53.7 3.0	31.50 -0.1	23.6 +0.2	8.59 .16	38.4 2.3	58.86 -.02	35.6 0.0
Aug. 7.1	31.45 .13	50.6 3.2	31.50 +.01	23.6 0.0	8.45 .11	35.9 2.6	58.85 .00	35.6 -0.1
17.0	31.37- .01	47.3 3.4	31.53 .04	23.5 -0.2	8.36 -0.5	33.2 2.7	58.85 +.02	35.4 0.3
27.0	31.43+ .12	43.8 3.5	31.58 .07	23.3 0.4	8.34 +.01	30.4 2.8	58.89 .05	35.0 0.5
Sept. 6.0	31.61+ .25	40.3 -3.6	31.66 +.10	22.8 -0.6	8.39 +.08	27.6 +2.7	58.95 +.08	34.5 -0.7
16.0	31.92 .37	36.7 3.5	31.77 .13	22.1 0.8	8.51 .16	24.9 2.6	59.05 .11	33.7 0.9
25.9	32.37 .50	33.2 3.4	31.92 .16	21.2 1.0	8.70 .23	22.4 2.3	59.18 .14	32.7 1.1
Oct. 5.9	32.93 .62	29.8 3.2	32.10 .19	20.1 1.2	8.97 .30	20.3 1.9	59.34 .18	31.5 1.3
15.9	33.62 .74	26.7 3.0	32.31 .23	18.8 1.4	9.30 .37	18.5 1.5	59.54 .22	30.1 1.5
25.8	34.41+ .84	23.8 -2.7	32.55 +.26	17.3 -1.6	9.70 +.43	17.3 +1.0	59.77 +.25	28.5 -1.7
Nov. 4.8	35.30 .92	21.3 2.3	32.83 .29	15.5 1.8	10.16 .48	16.6 +0.4	60.04 .28	26.7 1.9
14.8	36.27 .99	19.2 1.8	33.13 .31	13.6 1.9	10.65 .51	16.6 -0.3	60.33 .31	24.7 2.0
24.8	37.30 1.03	17.6 1.3	33.45 .32	11.6 2.0	11.18 .53	17.1 0.9	60.65 .32	22.7 2.1
Dec. 4.7	38.36 1.05	16.6 0.8	33.78 .33	9.6 2.0	11.71 .53	18.3 1.5	60.98 .33	20.6 2.1
14.7	39.42+1.03	16.1 -0.2	34.11 +.33	7.6 -2.0	12.24 +.51	20.1 -2.1	61.32 +.33	18.6 -2.0
24.7	40.45 .99	16.3 +0.4	34.43 .31	5.7 1.8	12.75 .48	22.4 2.6	61.65 .32	16.7 1.9
34.6	41.42+ .93	17.0 +1.1	34.74 +.29	3.9 -1.7	13.21 +.43	25.2 -3.1	61.96 +.30	14.9 -1.7



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Majoris.		$\delta$ Leonis.		$\delta$ Crateris.		$\tau$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 10 57	° ' " +62 17	h m 11 8	° ' " +21 4	h m 11 14	° ' " -14 13	h m 11 22	° ' " + 3 24
(Dec. 30.7)	32.46 +.57	23.2 -0.1	45.95 +.34	22.5 -1.6	18.98 +.33	59.1 -2.4	46.09 +.33	35.5 -2.1
Jan. 9.7	33.01 .52	23.4 +0.5	46.27 .31	21.1 1.3	19.29 .30	61.5 2.4	46.40 .30	33.5 1.9
19.6	33.50 .46	24.2 1.0	46.57 .28	20.0 0.9	19.57 .27	63.9 2.4	46.69 .27	31.6 1.7
29.6	33.92 .38	25.5 1.5	46.83 .24	19.3 0.6	19.82 .23	66.3 2.3	46.94 .23	30.0 1.5
Feb. 8.6	34.26 .29	27.2 1.9	47.04 .19	18.9 -0.2	20.03 .18	68.5 2.1	47.15 .19	28.6 1.2
18.5	34.51 +.20	29.3 +2.3	47.20 +.14	18.8 +0.1	20.18 +.14	70.6 -1.9	47.32 +.15	27.5 -0.9
28.5	34.67 .10	31.7 2.5	47.32 .09	19.1 0.4	20.30 .09	72.4 1.7	47.45 .10	26.7 0.7
Mar. 10.5	34.72 +.01	34.3 2.6	47.39 +.04	19.6 0.7	20.37 .05	74.0 1.5	47.53 .06	26.2 0.4
20.5	34.69 -.08	36.9 2.6	47.41 .00	20.4 0.8	20.39 +.01	75.4 1.2	47.56 +.02	25.9 -0.2
30.4	34.57 .16	39.5 2.5	47.39 -.04	21.3 1.0	20.38 -.02	76.5 1.0	47.56 -.02	25.8 0.0
Apr. 9.4	34.38 -.22	41.9 +2.3	47.34 -.07	22.4 +1.0	20.34 -.05	77.3 -0.7	47.53 -.04	25.9 +0.2
19.4	34.12 .28	44.1 2.0	47.26 .09	23.4 1.0	20.28 .07	77.9 0.5	47.48 .06	26.2 0.3
29.3	33.82 .32	45.9 1.6	47.16 .11	24.5 1.0	20.20 -.09	78.3 -0.2	47.40 .08	26.6 0.4
May 9.3	33.49 .34	47.3 1.2	47.05 .12	25.5 0.9	20.10 .10	78.4 0.0	47.31 .09	27.1 0.5
19.3	33.14 .35	48.3 0.7	46.93 .12	26.3 0.8	19.99 .11	78.3 +0.2	47.21 .10	27.7 0.6
29.3	32.79 -.35	48.8 +0.3	46.81 -.12	27.1 +0.7	19.89 -.11	78.1 +0.4	47.11 -.10	28.3 +0.6
June 8.2	32.44 .34	48.8 -0.2	46.69 .12	27.7 0.5	19.78 .11	77.6 0.5	47.01 .10	28.9 0.6
18.2	32.11 .31	48.4 0.7	46.57 .11	28.2 0.3	19.67 .10	77.0 0.7	46.91 .10	29.5 0.6
28.2	31.81 .28	47.5 1.1	46.47 .10	28.4 +0.2	19.57 .10	76.2 0.9	46.81 .09	30.1 0.6
July 8.2	31.55 .25	46.1 1.6	46.38 .08	28.5 0.0	19.48 .09	75.3 1.0	46.72 .08	30.7 0.5
18.1	31.32 -.20	44.3 -2.0	46.30 -.07	28.4 -0.2	19.39 -.07	74.2 +1.1	46.65 -.07	31.2 +0.4
28.1	31.14 .15	42.2 2.3	46.24 .05	28.0 0.4	19.33 .06	73.1 1.1	46.59 .05	31.6 0.4
Aug. 7.1	31.01 .10	39.7 2.6	46.20 -.03	27.5 0.6	19.28 .04	72.0 1.1	46.54 .03	32.0 0.5
17.0	30.94 -.04	36.9 2.9	46.19 .00	26.8 0.8	19.25 -.01	70.9 1.1	46.52 -.01	32.2 +0.1
27.0	30.93 +.02	33.9 3.1	46.20 +.02	25.8 1.0	19.25 +.01	69.9 1.0	46.51 +.01	32.2 0.0
Sept. 6.0	30.98 +.03	30.8 -3.2	46.24 +.06	24.7 -1.3	19.28 +.04	69.0 +0.8	46.53 +.04	32.2 -0.2
15.9	31.09 .15	27.5 3.3	46.31 .09	23.3 1.5	19.34 .08	68.2 0.6	46.59 .07	31.8 0.4
25.9	31.28 .22	24.1 3.3	46.41 .13	21.7 1.7	19.44 .12	67.7 0.4	46.68 .11	31.3 0.7
Oct. 5.9	31.53 .28	20.8 3.3	46.56 .16	19.9 1.9	19.58 .16	67.5 +0.1	46.80 .14	30.5 0.9
15.9	31.84 .35	17.5 3.2	46.74 .20	18.0 2.0	19.76 .20	67.6 -0.3	46.97 .18	29.4 1.2
25.9	32.23 +.42	14.4 -3.0	46.96 +.24	15.9 -2.1	19.97 +.24	68.0 -0.6	47.17 +.22	28.1 -1.4
Nov. 4.8	32.68 .47	11.5 2.7	47.22 .27	13.7 2.2	20.23 .27	68.8 1.0	47.41 .26	26.6 1.7
14.8	33.18 .52	8.9 2.4	47.51 .30	11.5 2.2	20.51 .30	70.0 1.3	47.68 .29	24.8 1.9
24.8	33.72 .56	6.8 2.0	47.83 .33	9.2 2.2	20.82 .32	71.5 1.7	47.98 .31	22.8 2.0
Dec. 4.7	34.29 .58	5.0 1.5	48.17 .34	7.1 2.1	21.15 .33	73.4 2.0	48.31 .32	20.8 2.1
14.7	34.88 +.59	3.8 -1.0	48.51 +.36	5.0 -1.9	21.49 +.34	75.4 -2.2	48.63 +.33	18.6 -2.2
24.7	35.47 .58	3.1 -0.4	48.86 .34	3.2 1.7	21.83 .33	77.7 2.3	48.96 .33	16.5 2.1
34.7	36.05 +.55	3.0 +0.2	49.19 +.33	1.6 -1.5	22.15 +.31	80.1 -2.4	49.28 +.31	14.4 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\lambda$ Draconis.		$\nu$ Leonis.		$\beta$ Leonis.		$\gamma$ Ursæ Majoris.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 11 45	° ' " +69 52	h m 11 31	° ' " - 0 16	h m 11 43	° ' " +15 7	h m 11 48	° ' " +54 14
(Dec. 30.7)	27.16 +.74	53.1 -0.2	48.08 +.32	6.4 -2.2	55.91 +.34	58.4 -1.9	32.94 +.48	58.3 -0.9
Jan. 9.7	27.88 .68	53.2 +0.4	48.40 .30	8.5 2.1	56.24 .32	56.6 1.6	33.42 .46	57.7 -0.4
19.6	28.55 .62	54.0 1.0	48.69 .28	10.5 1.9	56.54 .29	55.1 1.3	33.87 .43	57.6 +0.2
29.6	29.14 .54	55.4 1.6	48.95 .24	12.3 1.7	56.82 .25	53.9 1.0	34.27 .38	58.1 0.8
Feb. 8.6	29.63 .44	57.1 2.0	49.17 .20	13.9 1.4	57.05 .21	53.1 0.6	34.62 .32	59.1 1.3
18.5	30.01 +.32	59.3 +2.4	49.34 +.15	15.2 -1.2	57.25 +.17	52.7 -0.3	34.90 +.25	60.6 +1.7
28.5	30.27 .19	61.9 2.7	49.48 .11	16.2 0.9	57.40 .12	52.5 0.0	35.12 .18	62.5 2.0
Mar. 10.5	30.40 +.07	64.7 2.8	49.56 .07	17.0 0.6	57.50 .08	52.7 +0.3	35.26 .10	64.7 2.3
20.5	30.41 -.05	67.6 2.9	49.61 +.03	17.5 0.4	57.56 +.04	53.1 0.5	35.32 +.03	67.1 2.5
30.4	30.29 .16	70.4 2.8	49.62 -.01	17.8 -0.2	57.57 .00	53.8 0.7	35.32 -.04	69.6 2.5
Apr. 9.4	30.08 -.26	73.2 +2.6	49.60 -.03	17.9 0.0	57.56 -.03	54.6 +0.8	35.25 -.10	72.2 +2.5
19.4	29.77 .35	75.6 2.3	49.55 .06	17.8 +0.2	57.51 .06	55.5 0.9	35.13 .15	74.6 2.3
29.4	29.38 .42	77.7 1.9	49.49 .08	17.6 0.3	57.44 .08	56.4 1.0	34.96 .19	76.8 2.0
May 9.3	28.93 .47	79.5 1.5	49.40 .09	17.2 0.4	57.36 .09	57.4 0.9	34.76 .22	78.7 1.7
19.3	28.45 .50	80.7 1.0	49.31 .10	16.7 0.5	57.26 .10	58.3 0.9	34.53 .24	80.2 1.4
June 29.3	27.94 -.51	81.5 +0.5	49.21 -.10	16.2 +0.6	57.15 -.11	59.2 +0.8	34.28 -.25	81.4 +1.0
8.3	27.43 .51	81.8 0.0	49.11 .10	15.6 0.6	57.04 .11	59.9 0.7	34.02 .26	82.1 0.5
18.2	26.94 .49	81.5 -0.5	49.01 .10	14.9 0.6	56.93 .11	60.6 0.6	33.77 .25	82.4 +0.1
28.2	26.45 .46	80.7 1.0	48.91 .09	14.3 0.6	56.83 .10	61.1 0.4	33.52 .24	82.3 -0.4
July 8.2	26.01 .42	79.4 1.5	48.82 .08	13.7 0.6	56.73 .10	61.4 0.3	33.28 .22	81.7 0.8
18.1	25.61 -.37	77.6 -2.0	48.74 -.07	13.1 +0.6	56.63 -.09	61.6 +0.1	33.07 -.20	80.7 -1.2
28.1	25.27 .31	75.4 2.4	48.67 .06	12.5 0.5	56.55 .07	61.6 -0.1	32.88 .18	79.2 1.6
Aug. 7.1	25.00 .24	72.9 2.7	48.62 .05	12.0 0.4	56.49 .06	61.4 0.3	32.72 .14	77.4 2.0
17.1	24.80 .16	70.0 3.0	48.58 -.02	11.6 0.3	56.44 .04	61.0 0.5	32.59 .11	75.2 2.3
27.0	24.67 -.08	66.8 3.3	48.57 .00	11.3 +0.2	56.41 -.01	60.5 0.7	32.50 .06	72.7 2.6
Sept. 6.0	24.63 .00	63.4 -3.4	48.59 +.03	11.2 0.0	56.42 +.02	59.7 -0.9	32.46 -.02	69.9 -2.9
16.0	24.68 +.09	59.9 3.6	48.63 .06	11.3 -0.2	56.45 .05	58.6 1.1	32.47 +.03	66.9 3.1
26.0	24.82 .19	56.3 3.6	48.71 .10	11.7 0.5	56.51 .08	57.4 1.4	32.53 .09	63.7 3.2
Oct. 5.9	25.05 .28	52.7 3.6	48.83 .14	12.3 0.7	56.62 .12	55.9 1.6	32.65 .15	60.4 3.3
15.9	25.37 .37	49.1 3.5	48.98 .18	13.1 1.0	56.76 .16	54.2 1.8	32.83 .21	57.1 3.3
Nov. 25.9	25.79 +.46	45.7 -3.3	49.18 +.21	14.2 -1.3	56.94 +.20	52.3 -2.0	33.07 +.27	53.8 -3.3
4.8	26.30 .55	42.6 3.0	49.41 .25	15.6 1.5	57.17 .24	50.3 2.1	33.37 .33	50.6 3.1
14.8	26.89 .62	39.7 2.6	49.68 .28	17.2 1.8	57.43 .27	48.1 2.2	33.73 .38	47.5 2.9
24.8	27.55 .68	37.3 2.2	49.98 .31	19.1 1.9	57.72 .30	45.8 2.3	34.13 .42	44.7 2.6
Dec. 4.8	28.25 .72	35.3 1.7	50.29 .32	21.1 2.1	58.04 .32	43.5 2.2	34.57 .46	42.3 2.2
14.7	29.00 +.74	33.9 -1.1	50.62 +.33	23.3 -2.2	58.37 +.34	41.3 -2.1	35.05 +.48	40.3 -1.8
24.7	29.75 .75	33.0 -0.5	50.95 .33	25.4 2.2	58.71 .34	39.2 2.0	35.53 .48	38.8 1.3
34.7	30.49 +.74	32.8 +0.1	51.28 +.32	27.6 -2.1	59.04 +.33	37.3 -1.8	36.01 +.47	37.8 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Virginis.		γ Draconis (H.).		γ Corvi.		β Chamæleontis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 12 0	° ' " + 9 17	h m 12 7	° ' " + 78 9	h m 12 10	° ' " - 16 58	h m 12 12	° ' " - 78 44
(Dec. 30.7)	5.15 +.34	26.4 -2.0	30.82 +1.16	71.7 -0.5	37.90 +.35	54.7 -2.3	26.56 +1.27	51.7 -1.5
Jan. 9.7	5.48 .32	24.5 1.8	31.99 1.12	71.5 +0.1	38.24 .33	57.0 2.3	27.79 1.18	53.5 2.0
19.7	5.78 .29	22.8 1.6	33.10 1.06	72.0 0.8	38.55 .30	59.3 2.3	28.94 1.08	55.8 2.5
29.6	6.06 .26	21.3 1.3	34.12 .95	73.1 1.4	38.84 .27	61.7 2.3	29.97 .96	58.5 2.9
Feb. 8.6	6.30 .22	20.2 1.0	35.02 .81	74.7 1.9	39.10 .23	63.9 2.2	30.87 .82	61.7 3.3
18.6	6.51 +.18	19.4 -0.7	35.76 +.65	76.9 +2.4	39.31 +.19	66.0 -2.0	31.62 +.66	65.1 -3.6
28.6	6.67 .14	18.9 0.4	36.32 .46	79.5 2.7	39.48 .15	68.0 1.8	32.20 .49	68.8 3.7
Mar. 10.5	6.79 .10	18.7 -0.1	36.68 .26	82.3 2.9	39.61 .11	69.7 1.6	32.61 .32	72.6 3.8
20.5	6.86 .06	18.7 +0.2	36.84 +.06	85.3 3.1	39.70 .07	71.2 1.4	32.84 +.15	76.4 3.8
30.5	6.90 +.02	19.1 0.4	36.80 - .14	88.4 3.1	39.76 +.03	72.5 1.2	32.91 - .01	80.2 3.7
Apr. 9.5	6.90 - .01	19.6 +0.6	36.57 - .33	91.4 +2.9	39.77 .00	73.5 -0.9	32.81 - .17	83.9 -3.6
19.4	6.87 .04	20.2 0.7	36.15 .49	94.3 2.7	39.76 - .02	74.3 0.7	32.56 .32	87.4 3.3
29.4	6.82 .06	20.9 0.8	35.59 .63	96.8 2.3	39.73 .05	74.9 0.5	32.17 .46	90.6 3.0
May 9.4	6.76 .08	21.7 0.8	34.89 .75	98.9 1.9	39.67 .07	75.3 -0.3	31.64 .58	93.5 2.6
19.3	6.67 .09	22.6 0.8	34.08 .84	100.6 1.4	39.60 .08	75.4 0.0	31.00 .69	95.9 2.2
29.3	6.58 - .10	23.4 +0.8	33.21 - .90	101.8 +0.9	39.51 - .09	75.4 +0.1	30.26 - .78	97.9 -1.8
June 8.3	6.48 .10	24.1 0.7	32.28 .93	102.5 +0.4	39.41 .10	75.2 0.3	29.44 .84	99.5 1.3
18.3	6.38 .10	24.8 0.7	31.34 .94	102.6 -0.2	39.31 .10	74.8 0.5	28.56 .89	100.5 0.7
28.2	6.27 .10	25.4 0.6	30.41 .92	102.1 0.7	39.20 .11	74.2 0.7	27.64 .91	101.0 -0.2
July 8.2	6.17 .10	25.9 0.4	29.51 .88	101.1 1.3	39.09 .11	73.4 0.8	26.71 .90	100.9 +0.3
18.2	6.08 - .09	26.3 +0.3	28.66 - .81	99.6 -1.7	38.99 - .10	72.6 +0.9	25.80 - .88	100.3 +0.9
28.1	5.99 .08	26.6 +0.2	27.88 .73	97.6 2.2	38.89 .09	71.6 1.0	24.93 .82	99.1 1.4
Aug. 7.1	5.92 .07	26.7 0.0	27.20 .63	95.2 2.6	38.80 .08	70.6 1.0	24.14 .73	97.5 1.9
17.1	5.86 .05	26.6 -0.2	26.61 .52	92.4 3.0	38.73 .06	69.5 1.0	23.46 .61	95.3 2.3
27.1	5.82 - .03	26.4 0.3	26.15 .40	89.2 3.3	38.68 .04	68.5 1.0	22.91 .46	92.8 2.6
Sept. 6.0	5.81 .00	25.9 -0.6	25.82 - .26	85.8 -3.5	38.65 - .01	67.5 +0.9	22.52 - .29	90.1 +2.9
16.0	5.83 +.03	25.2 0.8	25.63 - .11	82.2 3.7	38.66 +.02	66.6 0.8	22.32 - .10	87.1 3.0
26.0	5.88 .07	24.3 1.0	25.60 +.04	78.4 3.8	38.70 .06	65.9 0.6	22.31 +.10	84.1 3.0
Oct. 6.0	5.96 .11	23.2 1.2	25.72 .21	74.6 3.8	38.78 .10	65.5 +0.3	22.52 .31	81.1 3.0
15.9	6.09 .15	21.8 1.5	26.01 .37	70.8 3.7	38.90 .14	65.3 0.0	22.94 .51	78.2 2.7
25.9	6.26 +.19	20.2 -1.7	26.46 +.53	67.1 -3.6	39.07 +.19	65.4 -0.3	23.56 +.71	75.6 +2.4
Nov. 4.9	6.47 .23	18.4 1.9	27.06 .68	63.6 3.3	39.29 .23	65.9 0.7	24.37 .88	73.4 2.0
14.8	6.71 .26	16.4 2.1	27.82 .82	60.5 3.0	39.54 .27	66.7 1.0	25.34 1.03	71.7 1.5
24.8	6.99 .29	14.3 2.2	28.72 .94	57.7 2.6	39.83 .30	67.9 1.3	26.45 1.15	70.6 0.9
Dec. 4.8	7.30 .32	12.1 2.2	29.73 1.04	55.3 2.1	40.15 .33	69.4 1.6	27.66 1.23	70.0 +0.2
14.8	7.63 +.33	9.9 -2.2	30.83 +1.11	53.5 -1.5	40.49 +.31	71.2 -1.9	28.93 +1.27	70.1 -0.4
24.7	7.96 .33	7.7 2.1	31.98 1.15	52.3 0.9	40.83 .34	73.2 2.1	30.22 1.27	70.8 1.0
34.7	8.29 +.33	5.7 -2.0	33.15 +1.16	51.7 -0.3	41.17 +.34	75.4 -2.3	31.48 +1.24	72.1 -1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Virginis.		$\alpha^1$ Crucis.		$\beta$ Corvi.		$\kappa$ Draconis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 12 14	° ' 6	h m 12 20	° ' 32	h m 12 29	° ' 50	h m 12 29	° ' 19
(Dec. 30.7)	s	"	s	"	s	"	s	"
Jan. 9.7	45.51 +.34	28.6 -2.2	59.93 +.60	11.4 -1.7	5.94 +.36	18.3 -2.1	11.73 +.75	74.8 -1.0
19.7	45.84 .32	30.7 2.1	60.53 .57	13.3 2.1	6.29 .34	20.5 2.3	12.48 .73	74.1 -0.4
29.6	46.15 .30	32.7 1.9	61.08 .53	15.7 2.6	6.63 .32	22.8 2.4	13.21 .70	74.0 +0.3
Feb. 8.6	46.44 .27	34.5 1.7	61.59 .47	18.5 2.9	6.94 .29	25.2 2.4	13.89 .64	74.6 0.9
18.6	46.69 .23	36.1 1.5	62.04 .41	21.6 3.2	7.21 .26	27.6 2.3	14.50 .56	75.8 1.5
28.6	46.90 +.19	37.4 -1.2	62.41 +.34	24.9 -3.4	7.45 +.22	29.9 -2.2	15.03 +.47	77.6 +2.0
Mar. 10.5	47.07 .15	38.5 0.9	62.72 .27	28.4 3.5	7.64 .17	32.1 2.1	15.44 .36	79.8 2.4
20.5	47.20 .11	39.2 0.6	62.95 .19	32.0 3.5	7.79 .13	34.1 1.9	15.75 .24	82.4 2.7
30.5	47.29 .07	39.7 0.4	63.10 .12	35.5 3.5	7.91 .09	35.9 1.7	15.92 +.12	85.3 2.9
Apr. 9.5	47.35 .04	40.0 -0.1	63.18 +.05	38.9 3.3	7.98 .06	37.5 1.5	15.98 .00	88.3 3.0
19.4	47.37 +.01	40.0 0.0	63.19 .02	42.2 -3.1	8.02 +.02	38.9 -1.3	15.92 -1.2	91.3 +2.9
29.4	47.36 -.02	40.0 +0.2	63.14 .08	45.2 2.9	8.03 -.01	40.0 1.0	15.75 .22	94.2 2.8
May 9.4	47.33 .04	39.6 0.4	63.03 .14	48.0 2.6	8.01 .03	40.9 0.8	15.48 .31	96.8 2.5
19.3	47.27 .06	39.1 0.5	62.87 .19	50.4 2.2	7.96 .05	41.6 0.6	15.13 .39	99.2 2.2
29.3	47.20 .08	38.6 0.6	62.66 .23	52.5 1.8	7.90 .07	42.1 0.3	14.71 .45	101.2 1.8
June 8.3	47.12 -.09	38.0 +0.6	62.41 -.26	54.1 -1.4	7.82 -.09	42.3 -0.1	14.23 -.49	102.8 +1.3
18.3	47.03 .09	37.4 0.6	62.13 .29	55.3 0.9	7.73 .10	42.3 +0.1	13.72 .52	103.8 0.8
28.2	46.94 .10	36.8 0.6	61.82 .31	56.0 -0.4	7.62 .11	42.0 0.3	13.20 .53	104.4 +0.3
July 8.2	46.84 .10	36.1 0.6	61.50 .32	56.2 0.0	7.51 .11	41.6 0.5	12.66 .53	104.4 -0.3
18.2	46.74 .10	35.5 0.6	61.16 .33	55.9 +0.5	7.40 .12	40.9 0.7	12.13 .52	103.9 0.8
28.2	46.64 -.09	34.9 +0.6	60.83 -.32	55.1 +1.0	7.28 -.12	40.1 +0.9	11.62 -.49	102.9 -1.3
Aug. 7.1	46.55 .09	34.3 0.5	60.52 .30	53.9 1.4	7.17 .11	39.1 1.0	11.14 .45	101.3 1.8
17.1	46.47 .07	33.9 0.4	60.23 .27	52.2 1.8	7.06 .10	38.0 1.1	10.71 .41	99.3 2.2
27.1	46.40 .06	33.5 0.3	59.97 .23	50.2 2.2	6.97 .08	36.8 1.2	10.33 .35	96.9 2.6
Sept. 6.0	46.35 .04	33.3 +0.2	59.77 .17	47.9 2.4	6.90 .06	35.6 1.2	10.02 .28	94.1 3.0
16.0	46.32 -.01	33.2 0.0	59.63 -.10	45.3 +2.6	6.85 -.03	34.4 +1.2	9.78 -.20	91.0 -3.3
26.0	46.33 +.02	33.3 -0.2	59.56 -.03	42.6 2.7	6.84 .00	33.3 1.1	9.62 .12	87.6 3.5
Oct. 6.0	46.37 .05	33.6 0.4	59.57 +.06	39.9 2.7	6.86 +.04	32.2 0.9	9.55 -.02	84.0 3.6
15.9	46.44 .09	34.2 0.7	59.67 .15	37.3 2.6	6.92 .09	31.4 0.7	9.57 +.08	80.3 3.7
25.9	46.55 .14	35.0 1.0	59.86 .24	34.8 2.3	7.03 .14	30.8 0.4	9.70 .18	76.5 3.7
Nov. 4.9	46.71 +.18	36.1 -1.2	60.14 +.32	32.7 +1.9	7.19 +.18	30.6 +0.1	9.93 +.29	72.8 -3.7
14.9	46.91 .22	37.5 1.5	60.51 .40	30.9 1.5	7.39 .23	30.7 -0.3	10.27 .39	69.2 3.5
24.8	47.15 .26	39.1 1.7	60.96 .48	29.6 1.0	7.64 .27	31.1 0.7	10.71 .48	65.8 3.2
Dec. 4.8	47.42 .29	40.9 1.9	61.47 .53	28.9 +0.5	7.93 .30	32.0 1.0	11.25 .57	62.7 2.9
14.8	47.72 .31	42.9 2.0	62.04 .57	28.7 -0.1	8.25 .33	33.2 1.4	11.86 .64	60.0 2.5
24.7	48.04 +.33	44.9 -2.1	62.63 +.59	29.2 -0.7	8.59 +.35	34.7 -1.7	12.54 +.70	57.7 -2.0
34.7	48.37 .33	47.1 2.2	63.24 .60	30.2 1.3	8.95 .35	36.6 2.0	13.27 .73	56.1 1.4
	48.70 +.33	49.2 -2.2	63.84 +.60	31.7 -1.8	9.30 +.36	38.6 -2.2	14.02 +.74	55.0 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT A

Mean Solar Date.	32 <sup>a</sup> Camelop. (H.)		α Can. Venaticorum.		θ Vir
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.
	h m 12 48	° ' " +83 56	h m 12 51	° ' " +38 51	1
(Dec. 30.7)	23.13 +2.12	75.0 -0.9	19.21 +.39	28.5 -1.9	4
Jan. 9.7	25.26 2.10	74.4 -0.3	19.60 .38	26.8 1.4	1
19.7	27.38 2.05	74.5 +0.3	19.98 .37	25.7 0.9	
29.7	29.41 1.92	75.2 1.0	20.34 .34	25.0 -0.4	
Feb. 8.6	31.27 1.71	76.5 1.6	20.66 .31	24.9 +0.2	
18.6	32.89 +1.45	78.4 +2.1	20.95 +.26	25.3	
28.6	34.21 1.14	80.8 2.6	21.19 .22	26.2	
Mar. 10.6	35.18 .78	83.5 2.9	21.38 .17	27.5	
20.5	35.78 .41	86.6 3.1	21.52 .11	27	
30.5	36.00 +.02	89.7 3.1	21.61 .06	3	
Apr. 9.5	35.83 - .35	92.8 +3.1	21.65 +.02		
19.4	35.28 .70	95.8 2.9	21.65 -.02		
29.4	34.39 1.03	98.6 2.6	21.61		
May 9.4	33.20 1.31	101.1 2.3	21.53		
19.4	31.74 1.54	103.2 1.8	21.43		
29.3	30.07 -1.72	104.8 +1.3	21.		
June 8.3	28.25 1.85	105.9 0.8	21		
18.3	26.33 1.93	106.4 +0.3			
28.3	24.36 1.96	106.4 -0.3			
July 8.2	22.39 1.93	105.8 0.6			
18.2	20.47 -1.87	104.7			
28.2	18.65 1.77	103.0			
Aug. 7.1	16.94 1.61	100.0			
17.1	15.42 1.42	98			
27.1	14.09 1.20				
Sept. 6.1	13.00 - .96				
16.0	12.17 .64				
26.0	11.62 .1				
Oct. 6.0	11.16 -				

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Virginis.		η Ursæ Majoris.		η Bootis.		β Centauri.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 13 29	° ' " — 0 4	h m 13 43	° ' " +49 48	h m 13 49	° ' " +18 53	h m 13 56	° ' " —59 53
	s	"	s	"	s	"	s	"
(Dec. 30.8)	33.51 +.33	54.6 —2.1	34.03 +.43	39.4 —2.2	53.11 +.33	60.0 —2.3	41.72 +.58	0.1 —0.4
Jan. 9.8	33.84 .33	56.7 2.0	34.46 .43	37.4 1.7	53.44 .34	57.8 2.0	42.30 .58	0.8 0.9
19.7	34.17 .32	58.7 1.9	34.89 .43	35.9 1.1	53.78 .33	55.9 1.7	42.89 .58	2.0 1.4
29.7	34.49 .30	60.5 1.7	35.32 .42	35.1 —0.5	54.11 .32	54.4 1.3	43.46 .56	3.6 1.8
Feb. 8.7	34.78 .28	62.0 1.4	35.73 .39	34.9 +0.1	54.42 .30	53.3 0.9	44.00 .52	5.6 2.2
18.7	35.04 +.25	63.3 —1.2	36.10 +.35	35.3 +0.7	54.70 +.27	52.6 —0.5	44.50 +.48	8.0 —2.5
28.6	35.28 .22	64.4 0.9	36.43 .30	36.3 1.2	54.96 .24	52.3 0.0	44.96 .43	10.6 2.7
Mar. 10.6	35.48 .18	65.1 0.6	36.71 .25	37.8 1.7	55.18 .20	52.5 +0.4	45.36 .37	13.4 2.8
20.6	35.64 .15	65.5 0.3	36.93 .20	39.7 2.1	55.36 .17	53.0 0.7	45.70 .31	16.3 2.9
30.5	35.77 .11	65.7 —0.1	37.10 .14	42.0 2.4	55.51 .13	53.9 1.0	45.99 .25	19.3 3.0
Apr. 9.5	35.86 +.08	65.7 +0.2	37.21 +.08	44.5 +2.6	55.62 +.09	55.1 +1.3	46.21 +.19	22.3 —3.0
19.5	35.93 .05	65.4 0.4	37.26 +.03	47.2 2.7	55.70 .06	56.5 1.4	46.37 .13	25.2 2.9
29.5	35.96 +.02	65.0 0.5	37.26 —.02	50.0 2.7	55.74 +.03	58.0 1.5	46.47 .07	28.0 2.7
May 9.4	35.97 .00	64.4 0.6	37.21 .07	52.6 2.6	55.75 .00	59.5 1.6	46.51 +.01	30.6 2.5
19.4	35.96 —.03	63.8 0.7	37.12 .11	55.2 2.4	55.74 —.03	61.1 1.6	46.50 —.04	33.1 2.3
29.4	35.92 —.05	63.1 +0.7	36.98 —.15	57.4 +2.1	55.70 —.05	62.6 +1.5	46.43 —.10	35.3 —2.0
June 8.3	35.86 .06	62.3 0.7	36.82 .18	59.4 1.8	55.64 .07	64.1 1.4	46.31 .15	37.1 1.7
18.3	35.79 .08	61.6 0.7	36.62 .21	61.0 1.4	55.56 .09	65.4 1.2	46.14 .19	38.6 1.3
28.3	35.71 .09	60.9 0.7	36.41 .23	62.2 1.0	55.46 .11	66.5 1.0	45.92 .23	39.7 0.9
July 8.3	35.61 .10	60.2 0.7	36.17 .24	63.0 0.6	55.34 .12	67.4 0.8	45.67 .27	40.4 —0.5
18.2	35.50 —.11	59.5 +0.6	35.93 —.25	63.4 +0.1	55.22 —.13	68.0 +0.5	45.38 —.29	40.7 0.0
28.2	35.38 .12	59.0 0.5	35.68 .25	63.2 —0.4	55.08 .14	68.4 +0.3	45.08 .30	40.5 +0.4
Aug. 7.2	35.26 .11	58.5 0.4	35.43 .24	62.6 0.8	54.94 .14	68.5 0.0	44.77 .31	39.9 0.8
17.2	35.15 .11	58.1 0.3	35.19 .23	61.6 1.3	54.81 .13	68.4 —0.3	44.47 .30	38.8 1.3
27.1	35.05 .10	57.9 +0.2	34.97 .21	60.1 1.7	54.68 .12	68.0 0.6	44.18 .27	37.3 1.7
Sept. 6.1	34.96 —.08	57.8 0.0	34.77 —.18	58.2 —2.1	54.56 —.10	67.3 —0.8	43.92 —.23	35.5 +2.0
16.1	34.89 .05	57.9 —0.2	34.61 .15	55.9 2.5	54.47 .08	66.4 1.1	43.71 .18	33.4 2.2
26.0	34.86 —.02	58.2 0.4	34.48 .10	53.2 2.8	54.40 .05	65.1 1.4	43.57 .12	31.1 2.4
Oct. 6.0	34.85 +.02	58.6 0.6	34.40 —.05	50.3 3.1	54.37 —.01	63.6 1.7	43.49 —.04	28.6 2.8
16.0	34.89 .06	59.3 0.8	34.38 +.01	47.1 3.3	54.38 +.03	61.8 1.9	43.49 +.04	26.1 2.4
26.0	34.97 +.11	60.3 —1.1	34.42 +.07	43.7 —3.4	54.43 +.08	59.7 —2.2	43.58 +.14	23.7 +2.3
Nov. 4.9	35.10 .15	61.5 1.3	34.52 .13	40.2 3.5	54.53 .13	57.4 2.4	43.77 .23	21.5 2.1
14.9	35.28 .20	63.0 1.6	34.69 .20	36.7 3.5	54.68 .17	55.0 2.5	44.04 .32	19.6 1.8
24.9	35.50 .24	64.7 1.8	34.92 .26	33.2 3.4	54.88 .22	52.4 2.6	44.40 .39	18.0 1.4
Dec. 4.8	35.76 .27	66.6 1.9	35.21 .31	29.9 3.2	55.12 .26	49.8 2.6	44.83 .46	16.8 0.9
14.8	36.05 +.30	68.6 —2.0	35.55 +.36	26.8 —2.9	55.39 +.29	47.2 —2.5	45.33 +.51	16.2 +0.4
24.8	36.36 .32	70.7 2.1	35.93 .40	24.1 2.5	55.70 .32	44.7 2.4	45.87 .55	16.0 —0.1
34.8	36.69 +.34	72.7 —2.1	36.34 +.48	21.8 —2.0	56.03 +.33	42.4 —2.2	46.44 +.59	16.4 —0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Draconis.		$\alpha$ Bootis. ( <i>Arcturus</i> .)		$\theta$ Bootis.		$\rho$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 14 1	° ' " +64 50	h m 14 11	° ' " +19 41	h m 14 21	° ' " +52 18	h m 14 27	° ' " +30 48
(Dec. 30.8)	38.86 +.55	65.9 -2.3	3.69 +.32	75.3 -2.4	45.38 +.41	41.2 -2.6	28.91 +.33	35.9 -2.6
Jan. 9.8	39.43 .57	63.9 1.7	4.01 .33	73.0 2.1	45.80 .43	38.9 2.1	29.24 .34	33.5 2.2
19.8	40.02 .59	62.5 1.0	4.34 .33	71.0 1.8	46.24 .44	37.1 1.5	29.59 .35	31.5 1.8
29.7	40.62 .58	61.8 -0.4	4.67 .32	69.4 1.4	46.68 .44	35.9 0.9	29.94 .34	29.9 1.3
Feb. 8.7	41.20 .55	61.8 +0.3	4.99 .30	68.1 1.0	47.11 .42	35.3 -0.2	30.28 .33	28.9 0.8
18.7	41.73 +.51	62.4 +0.9	5.28 +.28	67.3 -0.6	47.52 +.39	35.4 +0.4	30.60 +.31	28.4 -0.2
28.7	42.22 .45	63.7 1.5	5.55 .25	67.0 -0.1	47.90 .35	36.1 1.0	30.90 .28	28.4 +0.3
Mar. 10.6	42.64 .38	65.5 2.0	5.79 .22	67.1 +0.3	48.23 .31	37.4 1.5	31.16 .25	29.0 0.8
20.6	42.98 .30	67.8 2.5	5.99 .18	67.6 0.7	48.51 .25	39.2 2.0	31.39 .21	30.0 1.2
30.6	43.23 .21	70.4 2.8	6.15 .15	68.5 1.0	48.74 .19	41.4 2.4	31.58 .17	31.4 1.6
Apr. 9.5	43.39 +.12	73.4 +3.0	6.28 +.11	69.6 +1.3	48.90 +.14	44.0 +2.7	31.73 +.13	33.1 +1.9
19.5	43.47 +.03	76.4 3.1	6.38 .08	71.0 1.5	49.01 .08	46.8 2.8	31.84 .09	35.1 2.1
29.5	43.46 -.05	79.5 3.0	6.44 .05	72.5 1.6	49.06 +.02	49.6 2.9	31.92 .06	37.3 2.2
May 9.5	43.37 .13	82.5 2.9	6.47 +.02	74.2 1.6	49.06 -.03	52.5 2.8	31.96 +.02	39.5 2.2
19.4	43.20 .20	85.3 2.7	6.47 -.01	75.8 1.6	49.00 .08	55.3 2.7	31.96 -.01	41.7 2.2
29.4	42.96 -.26	87.9 +2.4	6.45 -.04	77.4 +1.6	48.90 -.13	57.9 +2.5	31.93 -.04	43.9 +2.1
June 8.4	42.67 .32	90.1 2.0	6.40 .06	78.9 1.5	48.75 .17	60.3 2.2	31.87 .07	45.9 1.9
18.4	42.33 .36	91.9 1.6	6.32 .08	80.3 1.3	48.57 .20	62.3 1.8	31.79 .10	47.7 1.7
28.3	41.95 .40	93.2 1.1	6.23 .10	81.5 1.1	48.35 .23	63.9 1.4	31.68 .12	49.2 1.4
July 8.3	41.53 .42	94.0 0.6	6.11 .12	82.5 0.9	48.10 .25	65.1 1.0	31.54 .14	50.5 1.1
18.3	41.10 -.44	94.3 +0.1	5.99 -.13	83.2 +0.6	47.84 -.27	65.8 +0.5	31.39 -.16	51.4 +0.7
28.2	40.66 .44	94.1 -0.5	5.85 .14	83.7 0.3	47.56 .28	66.1 0.0	31.23 .17	52.0 +0.4
Aug. 7.2	40.22 .43	93.4 1.0	5.70 .15	83.9 +0.1	47.27 .29	65.9 -0.5	31.05 .18	52.2 0.0
17.2	39.79 .42	92.1 1.5	5.55 .15	83.8 -0.2	46.99 .28	65.2 0.9	30.87 .18	52.0 -0.4
27.2	39.39 .39	90.4 1.9	5.41 .14	83.4 0.5	46.71 .27	64.0 1.4	30.70 .17	51.5 0.7
Sept. 6.1	39.02 -.35	88.2 -2.4	5.27 -.13	82.8 -0.8	46.45 -.25	62.3 -1.8	30.54 -.16	50.6 -1.1
16.1	38.70 .30	85.7 2.8	5.15 .10	81.8 1.1	46.22 .21	60.3 2.2	30.39 .14	49.3 1.4
26.1	38.43 .23	82.7 3.1	5.06 .07	80.5 1.4	46.02 .17	57.8 2.6	30.27 .11	47.7 1.8
Oct. 6.1	38.23 .16	79.5 3.4	5.01 -.04	79.0 1.7	45.87 .12	55.0 3.0	30.18 .07	45.7 2.1
16.0	38.11 -.08	76.0 3.6	4.99 .00	77.2 2.0	45.78 -.06	51.9 3.2	30.13 -.02	43.5 2.4
26.0	38.07 +.01	72.3 -3.7	5.02 +.05	75.1 -2.2	45.75 .00	48.6 -3.4	30.13 +.03	41.0 -2.6
Nov. 5.0	38.13 .10	68.5 3.8	5.09 .10	72.7 2.4	45.78 +.07	45.0 3.6	30.18 .08	38.2 2.8
14.9	38.28 .20	64.8 3.7	5.22 .15	70.3 2.6	45.88 .14	41.4 3.6	30.28 .13	35.3 3.0
24.9	38.53 .29	61.1 3.6	5.39 .20	67.6 2.7	46.06 .21	37.8 3.6	30.44 .18	32.3 3.0
Dec. 4.9	38.86 .38	57.6 3.3	5.61 .24	64.9 2.7	46.30 .27	34.3 3.4	30.65 .23	29.2 3.0
14.9	39.28 +.45	54.4 -3.0	5.87 +.28	62.2 -2.6	46.61 +.33	30.9 -3.2	30.90 +.27	26.2 -2.9
24.8	39.77 .51	51.6 2.5	6.17 .30	59.6 2.5	46.96 .38	27.9 2.8	31.20 .31	23.4 2.7
34.8	40.32 +.56	49.3 -1.0	6.48 +.32	57.2 -2.4	47.36 +.42	25.3 -2.4	31.52 +.34	20.8 -2.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Ursæ Minoris.		α Centauri (mean.)		ε Bootis.		α Libræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 14 27	° ' " +76 8	h m 14 32	° ' " -60 24	h m 14 40	° ' " +27 29	h m 14 45	° ' " -15 37
(Dec. 30.8)	41.65 +.84	17.7 -2.4	44.36 +.55	58.0 +0.1	34.78 +.32	44.3 -2.6	17.74 +.33	22.4 -1.5
Jan. 9.8	42.50 .89	15.7 1.8	44.93 .57	58.2 -0.4	35.11 .33	41.8 2.2	18.07 .33	23.9 1.6
19.8	43.43 .94	14.2 1.1	45.51 .58	58.8 0.9	35.44 .34	39.8 1.9	18.41 .34	25.4 1.6
29.7	44.40 .95	13.5 -0.5	46.09 .57	59.9 1.3	35.78 .34	38.1 1.4	18.75 .33	27.1 1.6
Feb. 8.7	45.37 .93	13.3 +0.2	46.65 .54	61.4 1.7	36.12 .33	36.9 0.9	19.08 .32	28.7 1.5
18.7	46.29 +.88	13.9 +0.9	47.19 +.51	63.3 -2.0	36.44 +.31	36.3 -0.4	19.39 +.30	30.2 -1.4
28.7	47.15 .80	15.1 1.5	47.69 .47	65.3 2.3	36.73 .28	36.1 +0.1	19.68 .28	31.6 1.3
Mar. 10.6	47.90 .69	16.9 2.0	48.14 .43	67.7 2.5	37.00 .25	36.5 0.6	19.95 .25	32.8 1.1
20.6	48.53 .56	19.2 2.5	48.54 .37	70.3 2.6	37.23 .22	37.3 1.0	20.19 .22	33.8 0.9
30.6	49.02 .41	21.9 2.9	48.88 .32	73.0 2.7	37.43 .18	38.5 1.4	20.40 .19	34.6 0.8
Apr. 9.6	49.35 +.25	24.9 +3.1	49.17 +.26	75.8 -2.8	37.59 +.14	40.1 +1.7	20.58 +.16	35.3 -0.6
19.5	49.53 +.09	28.0 3.2	49.40 .80	78.6 2.8	37.72 .11	42.0 1.9	20.72 .13	35.8 0.4
29.5	49.54 -0.06	31.2 3.2	49.56 .13	81.3 2.7	37.81 .08	44.0 2.1	20.84 .11	36.2 0.3
May 9.5	49.40 .22	34.4 3.1	49.67 .07	83.9 2.6	37.87 .04	46.1 2.1	20.93 .08	36.4 -0.1
19.4	49.11 .56	37.4 2.9	49.71 +.01	86.4 2.4	37.89 +.01	48.3 2.1	21.00 .05	36.4 0.0
29.4	48.68 -0.49	40.1 +2.6	49.70 -0.05	88.7 -2.1	37.88 -0.02	50.4 +2.0	21.03 +.02	36.4 +0.1
June 8.4	48.14 .60	42.5 2.2	49.62 .11	90.8 1.9	37.84 .05	52.4 1.9	21.04 -0.01	36.3 0.2
18.4	47.48 .69	44.5 1.7	49.48 .16	92.6 1.6	37.77 .08	54.2 1.7	21.01 .01	36.1 0.3
28.3	46.75 .77	46.0 1.2	49.29 .21	93.9 1.2	37.68 .10	55.7 1.4	20.96 .06	35.8 0.3
July 8.3	45.95 .83	47.0 0.7	49.06 .26	94.9 0.8	37.56 .13	57.0 1.2	20.88 .09	35.4 0.4
18.3	45.10 -0.86	47.5 +0.2	48.78 -0.29	95.5 -0.4	37.42 -0.15	58.1 +0.9	20.78 -0.11	35.0 +0.4
28.3	44.22 .88	47.4 -0.3	48.47 .32	95.7 0.0	37.26 .16	58.8 0.5	20.67 .13	34.5 0.3
Aug. 7.2	43.34 .88	46.8 0.9	48.14 .33	95.5 +0.5	37.10 .17	59.1 +0.2	20.54 .14	34.0 0.5
17.2	42.47 .85	45.7 1.4	47.80 .33	94.8 0.9	36.92 .17	59.1 -0.2	20.39 .14	33.4 0.6
27.2	41.63 .81	44.1 1.8	47.47 .32	93.7 1.3	36.75 .17	58.7 0.5	20.25 .14	32.8 0.6
Sept. 6.1	40.85 -0.75	42.0 -2.3	47.16 -0.30	92.2 +1.7	36.58 -0.16	58.0 -0.9	20.11 -0.13	32.2 +0.6
16.1	40.14 .67	39.5 2.7	46.89 .25	90.3 2.0	36.43 .14	57.0 1.2	19.99 .11	31.7 0.5
26.1	39.52 .56	36.6 3.1	46.67 .19	88.2 2.2	36.31 .11	55.6 1.2	19.89 .08	31.2 0.4
Oct. 6.1	39.01 .45	33.4 3.4	46.51 .11	85.9 2.4	36.21 .08	53.9 1.8	19.82 .05	30.8 0.3
16.0	38.63 .31	29.9 3.6	46.44 -0.03	83.4 2.4	36.15 -0.05	51.8 2.2	19.79 -0.01	30.5 +0.2
26.0	38.39 -0.16	26.2 -3.7	46.45 +0.06	80.9 +2.4	36.14 +0.01	49.5 -2.5	19.80 +0.04	30.4 0.0
Nov. 5.0	38.30 .00	22.4 3.8	46.55 .15	78.6 2.3	36.18 .06	46.9 2.7	19.86 .09	30.6 -0.2
15.0	38.38 +0.16	18.6 3.8	46.75 .25	76.4 2.0	36.27 .12	44.2 2.8	19.98 .14	30.9 0.5
24.9	38.63 .33	14.9 3.6	47.04 .33	74.5 1.7	36.42 .17	41.3 2.9	20.15 .19	31.5 0.7
Dec. 4.9	39.03 .48	11.3 3.4	47.42 .41	73.0 1.3	36.61 .22	38.3 2.9	20.36 .23	32.4 0.9
14.9	39.59 +0.63	8.1 -3.1	47.87 +0.47	71.9 +0.9	36.85 +0.26	35.4 -2.8	20.61 +0.27	33.4 -1.1
24.8	40.29 .75	5.2 2.6	48.37 .51	71.3 +0.4	37.13 .29	32.6 2.7	20.90 .30	34.7 1.3
34.8	41.10 +0.86	2.8 -2.1	48.92 +0.52	71.1 -0.1	37.44 +0.32	30.0 -2.5	21.22 +0.30	36.1 -1.5



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Ursæ Minoris.		$\beta$ Bootis.		$\beta$ Libræ.		$\mu^1$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 14 50	° ' " +74 33	h m 14 58	° ' " +40 46	h m 15 11	° ' " - 9 0	h m 15 20	° ' " +37 43
(Dec. 30.8)	57.06 +.70	43.1 -2.6	8.30 +.33	61.9 -2.9	34.51 +.30	41.7 -1.6	40.21 +.30	37.1 -2.9
Jan. 9.8	57.81 .77	40.7 2.0	8.64 .35	59.3 2.4	34.82 .31	43.3 1.6	40.52 .33	34.4 2.5
19.8	58.63 .83	39.0 1.4	9.01 .37	57.1 1.9	35.14 .32	44.9 1.6	40.86 .35	32.1 2.1
29.8	59.49 .86	37.8 0.8	9.38 .37	55.5 1.4	35.46 .32	46.4 1.5	41.22 .36	30.3 1.6
Feb. 8.7	60.37 .86	37.4 -0.1	9.75 .36	54.4 0.8	35.79 .32	47.9 1.4	41.58 .35	29.0 1.0
18.7	61.22 +.82	37.6 +0.6	10.11 +.35	53.9 -0.2	36.10 +.30	49.2 -1.2	41.93 +.34	28.2 -0.4
28.7	62.03 .76	38.5 1.2	10.45 .32	53.9 +0.4	36.39 .28	50.3 1.0	42.27 .32	28.1 +0.1
Mar. 10.7	62.76 .68	40.0 1.8	10.76 .29	54.6 0.9	36.67 .26	51.2 0.8	42.58 .30	28.5 0.7
20.6	63.39 .57	42.1 2.3	11.04 .25	55.8 1.4	36.92 .24	51.9 0.6	42.86 .27	29.5 1.2
30.6	63.91 .45	44.6 2.7	11.27 .21	57.5 1.9	37.14 .21	52.3 0.3	43.11 .23	30.9 1.7
Apr. 9.6	64.29 +.31	47.5 +3.0	11.46 +.27	59.6 +2.2	37.34 +.18	52.5 -0.1	43.32 +.19	32.8 +2.1
19.5	64.53 .17	50.6 3.2	11.61 .13	61.9 2.5	37.51 .15	52.6 0.0	43.50 .15	35.0 2.4
29.5	64.63 +.03	53.8 3.2	11.72 .08	64.5 2.6	37.65 .13	52.5 +0.2	43.63 .11	37.5 2.6
May 9.5	64.59 -.11	57.0 3.2	11.78 +.04	67.2 2.7	37.76 .10	52.2 0.3	43.72 .07	40.1 2.6
19.5	64.41 .24	60.1 3.0	11.80 .00	69.9 2.7	37.84 .07	51.8 0.4	43.77 +.03	42.8 2.7
29.4	64.10 -.37	63.0 +2.8	11.78 -.04	72.5 +2.5	37.90 +.04	51.3 +0.5	43.78 -.01	45.4 +2.6
June 8.4	63.67 .48	65.7 2.4	11.73 .08	74.9 2.3	37.92 +.01	50.8 0.5	43.76 .04	48.0 2.4
18.4	63.14 .57	67.9 2.0	11.63 .11	77.2 2.1	37.92 -.02	50.3 0.6	43.69 .08	50.3 2.2
28.4	62.53 .65	69.7 1.6	11.51 .14	79.1 1.8	37.88 .05	49.7 0.6	43.59 .12	52.4 1.9
July 8.3	61.84 .71	71.1 1.1	11.35 .17	80.7 1.4	37.82 .07	49.1 0.6	43.46 .15	54.2 1.6
18.3	61.10 -.76	72.0 +0.6	11.17 -.19	81.9 +1.0	37.73 -.10	48.6 +0.5	43.30 -.17	55.6 +1.2
28.3	60.32 .79	72.3 +0.1	10.96 .21	82.7 0.6	37.63 .12	48.1 0.5	43.12 .19	56.6 0.8
Aug. 7.3	59.52 .80	72.1 -0.5	10.75 .22	83.1 +0.2	37.50 .13	47.5 0.5	42.91 .21	57.2 +0.4
17.2	58.71 .80	71.3 1.0	10.52 .23	83.0 -0.3	37.36 .14	47.0 0.4	42.69 .22	57.5 0.0
27.2	57.92 .77	70.1 1.5	10.29 .23	82.5 0.7	37.21 .15	46.6 0.4	42.47 .22	57.2 -0.4
Sept. 6.2	57.17 -.72	68.3 -2.0	10.07 -.21	81.6 -1.1	37.06 -.14	46.2 +0.4	42.25 -.22	56.6 -0.8
16.1	56.48 .66	66.1 2.4	9.86 .19	80.2 1.6	36.93 .13	45.9 0.3	42.04 .20	55.5 1.3
26.1	55.85 .58	63.5 2.8	9.68 .16	78.4 2.0	36.81 .10	45.7 +0.2	41.85 .17	54.1 1.7
Oct. 6.1	55.32 .48	60.5 3.1	9.53 .13	76.3 2.3	36.72 .07	45.6 0.0	41.69 .14	52.2 2.1
16.1	54.90 .36	57.2 3.4	9.43 .08	73.8 2.6	36.66 -.03	45.7 -0.2	41.57 .10	50.0 2.4
26.0	54.60 -.23	53.6 -3.6	9.37 -.03	71.0 -2.9	36.65 +.01	46.0 -0.4	41.49 -.05	47.4 -2.7
Nov. 5.0	54.44 -.08	49.9 3.8	9.37 +.03	67.9 3.1	36.69 .06	46.3 0.5	41.47 .00	44.6 3.0
15.0	54.43 +.07	46.1 3.8	9.43 .09	64.6 3.3	36.77 .10	47.1 0.8	41.50 +.06	41.5 3.1
24.9	54.57 .22	42.3 3.7	9.55 .15	61.3 3.4	36.90 .16	48.1 1.0	41.59 .12	38.3 3.2
Dec. 4.9	54.87 .37	38.7 3.5	9.73 .20	57.9 3.3	37.09 .20	49.2 1.2	41.74 .18	35.0 3.3
14.9	55.31 +.50	35.2 -3.3	9.96 +.26	54.6 -3.2	37.31 +.24	50.5 -1.3	41.94 +.23	31.7 -3.2
24.9	55.88 .62	32.2 2.9	10.24 .30	51.5 3.0	37.57 .27	51.9 1.4	42.19 .27	28.6 3.0
34.8	56.56 +.74	29.5 -2.4	10.56 +.34	48.7 -2.7	37.86 +.30	53.4 -1.6	42.49 +.31	25.7 -2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Ursæ Minoris.		$\alpha$ Coronæ Borealis.		$\alpha$ Serpentis.		$\epsilon$ Serpentis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 15 20	° ' +72 11	h m 15 30	° ' +27 2	h m 15 39	° ' +6 44	h m 15 45	° ' +4 46
	"	"	"	"	"	"	"	"
(Dec. 30.9)	50.40 +.56	15.9 -2.9	24.56 +.28	63.1 -2.7	17.60 +.27	27.6 -2.0	46.89 +.27	47.0 -2.0
Jan. 9.8	51.01 .63	13.3 2.4	24.85 .30	60.5 2.4	17.88 .29	25.6 2.0	47.17 .29	45.0 1.9
19.8	51.69 .70	11.1 1.8	25.17 .32	58.2 2.1	18.18 .31	23.6 1.8	47.47 .30	43.2 1.8
29.8	52.43 .74	9.6 1.2	25.50 .33	56.3 1.7	18.50 .31	21.9 1.6	47.78 .31	41.5 1.6
Feb. 8.8	53.19 .76	8.7 -0.5	25.83 .33	54.8 1.2	18.81 .31	20.4 1.3	48.09 .31	40.1 1.3
18.7	53.96 +.74	8.5 +0.1	26.15 +.32	53.9 -0.7	19.12 +.30	19.3 -1.0	48.40 +.30	38.9 -1.0
28.7	54.70 .71	9.0 0.8	26.47 .30	53.5 -0.2	19.41 .29	18.5 0.6	48.70 .29	38.1 0.7
Mar. 10.7	55.38 .65	10.1 1.4	26.76 .28	53.5 +0.3	19.70 .27	18.0 -0.3	48.98 .27	37.6 -0.3
20.7	56.00 .57	11.8 2.0	27.03 .25	54.1 0.8	19.96 .25	18.0 +0.1	49.24 .25	37.5 0.0
30.6	56.52 .47	14.1 2.5	27.27 .23	55.2 1.3	20.19 .22	18.2 0.4	49.48 .23	37.7 +0.3
Apr. 9.6	56.94 +.36	16.8 +2.8	27.48 +.19	56.6 +1.6	20.40 +.20	18.8 +0.7	49.70 +.20	38.2 +0.6
19.6	57.25 .25	19.7 3.1	27.66 .16	58.4 1.9	20.59 .17	19.7 1.0	49.89 .18	39.0 0.9
29.5	57.44 +.13	22.9 3.2	27.80 .13	60.5 2.1	20.74 .14	20.8 1.2	50.05 .15	40.0 1.1
May 9.5	57.50 .00	26.2 3.2	27.91 .09	62.7 2.2	20.87 .11	22.0 1.3	50.19 .12	41.1 1.2
19.5	57.44 -.11	29.4 3.1	27.98 .06	65.0 2.3	20.97 .08	23.4 1.4	50.29 .09	42.4 1.3
29.5	57.27 -.23	32.5 +3.0	28.02 +.02	67.3 +2.3	21.04 +.05	24.8 +1.4	50.37 +.06	43.7 +1.3
June 8.4	56.99 .33	35.4 2.7	28.02 -.01	69.5 2.2	21.07 +.02	26.2 1.4	50.41 +.03	45.0 1.3
18.4	56.61 .43	38.0 2.4	27.99 .05	71.6 2.0	21.08 -.01	27.5 1.3	50.43 .00	46.3 1.2
28.4	56.14 .51	40.2 2.0	27.93 .08	73.5 1.8	21.06 .04	28.8 1.2	50.41 -.03	47.5 1.2
July 8.4	55.59 .58	42.0 1.5	27.84 .11	75.2 1.5	21.00 .07	30.0 1.1	50.36 .06	48.6 1.1
18.3	54.98 -.63	43.3 +1.1	27.72 -.13	76.6 +1.2	20.92 -.09	31.0 +1.0	50.28 -.09	49.6 +0.9
28.3	54.32 .68	44.1 +0.5	27.57 .16	77.7 0.9	20.81 .12	31.9 0.8	50.18 .11	50.5 0.8
Aug. 7.3	53.63 .70	44.3 0.0	27.41 .17	78.4 0.6	20.68 .14	32.6 0.6	50.05 .13	51.2 0.6
17.2	52.92 .71	44.1 -0.5	27.23 .18	78.8 +0.2	20.54 .15	33.1 0.4	49.91 .15	51.7 0.4
27.2	52.21 .70	43.3 1.0	27.04 .19	78.9 -0.1	20.38 .16	33.4 +0.2	49.75 .16	52.1 0.3
Sept. 6.2	51.51 -.68	42.0 -1.5	26.85 -.18	78.5 -0.5	20.22 -.16	33.5 0.0	49.59 -.16	52.2 +0.1
16.2	50.86 .63	40.3 2.0	26.67 .17	77.8 0.9	20.07 .15	33.4 -0.2	49.44 .15	52.2 -0.2
26.1	50.25 .57	38.1 2.4	26.50 .15	76.8 1.2	19.93 .13	33.0 0.5	49.30 .13	51.9 0.4
Oct. 6.1	49.71 -.49	35.4 2.8	26.36 .12	75.3 1.6	19.81 .10	32.5 0.7	49.18 .10	51.4 0.6
16.1	49.27 .59	32.4 3.2	26.26 .08	73.6 1.9	19.73 .07	31.7 0.9	49.09 .07	50.7 0.8
26.1	48.92 -.28	29.1 -3.4	26.20 -.04	71.5 -2.2	19.68 -.03	30.6 -1.2	49.04 -.03	49.8 -1.1
Nov. 5.0	48.69 .16	25.5 3.6	26.18 +.01	69.1 2.5	19.68 +.02	29.3 1.4	49.03 +.02	48.6 1.3
15.0	48.59 -.03	21.8 3.7	26.22 .06	66.5 2.7	19.72 .07	27.7 1.7	49.07 .07	47.2 1.5
25.0	48.63 +.10	18.0 3.8	26.30 .11	63.7 2.9	19.82 .12	25.9 1.8	49.16 .11	45.6 1.7
Dec. 4.9	48.80 .24	14.3 3.7	26.44 .17	60.8 2.9	19.96 .17	24.0 2.0	49.30 .16	43.8 1.9
14.9	49.11 +.37	10.7 -3.5	26.63 +.21	57.8 -2.9	20.15 +.21	22.0 -2.1	49.49 +.20	41.8 -2.0
24.9	49.54 .49	7.4 3.1	26.87 .25	55.0 2.8	20.38 .24	19.9 2.1	49.71 .24	39.8 2.0
34.9	50.08 +.60	4.4 -2.7	27.14 +.29	52.2 -2.7	20.64 +.27	17.8 -2.1	49.97 +.27	37.8 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date	ζ Ursæ Minoris.		ε Coronæ Borealis.		δ Scorpii.		β <sup>1</sup> Scorpii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 15 47	° ' +78 5	h m 15 53	° ' +27 9	h m 15 54	° ' -22 20	h m 15 59	° ' -19 31
	s	"	s	"	s	"	s	"
(Dec. 30.9)	34.27+ .66	60.5 -3.0	24.15 +.26	61.1 -2.8	21.72 +.30	4.3 -0.8	33.89 +.28	46.3 -0.8
Jan. 9.9	35.02 .80	57.7 2.6	24.43 .29	58.4 2.5	22.03 .32	5.1 0.9	34.18 .31	47.2 0.9
19.8	35.90 .92	55.4 2.1	24.73 .31	56.0 2.2	22.35 .33	6.1 1.0	34.50 .33	48.2 1.0
29.8	36.89 1.01	53.6 1.5	25.05 .32	54.0 1.8	22.69 .34	7.1 1.1	34.85 .33	49.3 1.1
Feb. 8.8	37.95 1.06	52.5 0.8	25.37 .33	52.5 1.3	23.03 .34	8.2 1.1	35.17 .33	50.4 1.0
18.7	39.05+1.08	52.0 -0.1	25.70 +.32	51.4 -0.8	23.37 +.33	9.3 -1.0	35.50 +.33	51.4 -1.0
28.7	40.13 1.04	52.2 +0.5	26.02 .31	50.9 -0.3	23.70 .32	10.3 1.0	35.82 .32	52.4 0.9
Mar. 10.7	41.16 .98	53.1 1.2	26.32 .29	50.8 +0.2	24.02 .30	11.2 0.9	36.13 .30	53.3 0.8
20.7	42.11 .88	54.6 1.8	26.60 .27	51.3 0.7	24.31 .28	12.1 0.8	36.43 .28	54.1 0.7
30.6	42.94 .75	56.6 2.3	26.86 .24	52.3 1.2	24.58 .26	12.9 0.7	36.70 .26	54.7 0.6
Apr. 9.6	43.63+ .61	59.1 +2.7	27.08 +.21	53.7 +1.6	24.83 +.24	13.5 -0.6	36.95 +.24	55.2 -0.4
19.6	44.16 .44	62.0 3.0	27.28 .18	55.5 1.9	25.05 .21	14.1 0.5	37.17 .21	55.6 0.3
29.6	44.51 .26	65.1 3.2	27.45 .15	57.5 2.1	25.25 .18	14.5 0.4	37.37 .18	55.9 0.2
May 9.5	44.67+ .07	68.4 3.3	27.58 .12	59.7 2.3	25.42 .15	14.9 0.3	37.54 .15	56.1 0.1
19.5	44.66- .11	71.7 3.2	27.68 .08	62.1 2.4	25.56 .12	15.2 0.3	37.68 .12	56.2 -0.1
29.5	44.46- .28	74.9 +3.1	27.74 +.04	64.5 +2.4	25.66 +.09	15.4 -0.2	37.78 +.09	56.2 0.0
June 8.4	44.09 .45	77.9 2.9	27.76 +.01	66.9 2.3	25.73 .05	15.6 0.1	37.86 .06	56.2 0.0
18.4	43.56 .60	80.6 2.6	27.76 -0.03	69.1 2.2	25.77 +.02	15.7 -0.1	37.90 +.02	56.2 0.1
28.4	42.88 .74	83.1 2.2	27.71 .07	71.2 2.0	25.77 -0.02	15.7 0.0	37.90 -0.01	56.1 0.1
July 8.4	42.07 .86	85.1 1.8	27.63 .10	73.0 1.7	25.73 .05	15.7 +0.1	37.87 .05	55.9 0.2
18.3	41.16- .96	86.7 +1.3	27.52 -0.12	74.6 +1.4	25.66 -0.08	15.6 +0.1	37.81 -0.08	55.7 +0.2
28.3	40.16 1.03	87.8 0.8	27.38 .15	75.9 1.1	25.56 .11	15.4 0.2	37.71 .11	55.5 0.3
Aug. 7.3	39.10 1.08	88.4 +0.3	27.22 .17	76.8 0.8	25.44 .14	15.2 0.3	37.59 .13	55.2 0.3
17.3	37.99 1.11	88.4 -0.2	27.04 .19	77.4 +0.4	25.29 .16	14.9 0.4	37.45 .15	54.9 0.4
27.2	36.87 1.11	88.0 0.7	26.85 .20	77.6 0.0	25.13 .17	14.5 0.4	37.29 .16	54.5 0.4
Sept. 6.2	35.76-1.09	87.0 -1.2	26.65 -0.20	77.4 -0.3	24.96 -0.17	14.0 +0.5	37.12 -0.16	54.0 +0.3
16.2	34.69 1.04	85.6 1.7	26.45 .19	76.9 0.7	24.80 .16	13.5 0.6	36.96 .16	53.6 0.5
26.1	33.68 .96	83.7 2.2	26.27 .17	76.0 1.1	24.65 .14	12.9 0.6	36.81 .14	53.1 0.5
Oct. 6.1	32.76 .86	81.3 2.6	26.12 .14	74.7 1.4	24.52 .11	12.3 0.6	36.68 .11	52.6 0.4
16.1	31.95 .74	78.5 2.9	25.99 .11	73.1 1.8	24.43 .07	11.8 0.5	36.58 .08	52.2 0.4
26.1	31.29- .59	75.4 -3.2	25.90 -0.06	71.2 -2.1	24.37 -0.03	11.3 +0.4	36.53 -0.04	51.9 +0.3
Nov. 5.0	30.78 .42	72.1 3.5	25.86 -0.02	68.9 2.4	24.37 +0.02	10.9 0.3	36.52 +0.02	51.7 +0.1
15.0	30.45 .23	68.5 3.6	25.87 +0.03	66.4 2.6	24.42 .08	10.7 +0.1	36.56 .07	51.6 0.0
25.0	30.32- .03	64.8 3.7	25.93 .09	63.6 2.8	24.52 .13	10.7 -0.1	36.66 .12	51.7 -0.2
Dec. 5.0	30.39+ .17	61.1 3.6	26.05 .14	60.7 2.9	24.68 .18	10.9 0.3	36.80 .17	52.0 0.4
14.9	30.66+ .37	57.5 -3.5	26.21 +.19	57.8 -2.9	24.88 +.23	11.2 -0.4	37.00 +.22	52.5 -0.6
24.9	31.12 .55	54.1 3.2	26.43 .23	54.9 2.8	25.13 .27	11.7 0.6	37.24 .26	53.2 0.7
34.9	31.77+ .73	51.1 2.9	26.68 +.27	52.2 -2.7	25.42 +.30	12.4 -0.8	37.51 +.29	54.0 -0.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Virginis.			$\alpha^1$ Crucis.			$\beta$ Corvi.			$\kappa$ Draconis.		
	Right Ascension.		Declination South.	Right Ascension.		Declination South.	Right Ascension.		Declination South.	Right Ascension.		Declination North.
	h m 12 14	° ' "	— 0 6	h m 12 20	° ' "	— 62 32	h m 12 29	° ' "	— 22 50	h m 12 29	° ' "	+ 70 19
(Dec. 30.7)	45.51 +.34	28.6 -2.2		59.93 +.60	11.4 -1.7		5.94 +.36	18.3 -2.1		11.73 +.75	74.8 -1.0	
Jan. 9.7	45.84 .32	30.7 2.1		60.53 .57	13.3 2.1		6.29 .34	20.5 2.3		12.48 .73	74.1 -0.4	
19.7	46.15 .30	32.7 1.9		61.08 .53	15.7 2.6		6.63 .32	22.8 2.4		13.21 .70	74.0 +0.3	
29.6	46.44 .27	34.5 1.7		61.59 .47	18.5 2.9		6.94 .29	25.2 2.4		13.89 .64	74.6 0.9	
Feb. 8.6	46.69 .23	36.1 1.5		62.04 .41	21.6 3.2		7.21 .26	27.6 2.3		14.50 .56	75.8 1.5	
18.6	46.90 +.19	37.4 -1.2		62.41 +.34	24.9 -3.4		7.45 +.22	29.9 -2.2		15.03 +.47	77.6 +2.0	
28.6	47.07 .15	38.5 0.9		62.72 .27	28.4 3.5		7.64 .17	32.1 2.1		15.44 .36	79.8 2.4	
Mar. 10.5	47.20 .11	39.2 0.6		62.95 .19	32.0 3.5		7.79 .13	34.1 1.9		15.75 .24	82.4 2.7	
20.5	47.29 .07	39.7 0.4		63.10 .12	35.5 3.5		7.91 .09	35.9 1.7		15.92 +.12	85.3 2.9	
30.5	47.35 .04	40.0 -0.1		63.18 +.05	38.9 3.3		7.98 .06	37.5 1.5		15.98 .00	88.3 3.0	
Apr. 9.5	47.37 +.01	40.0 0.0		63.19 .02	42.2 -3.1		8.02 +.02	38.9 -1.3		15.92 -1.2	91.3 +2.9	
19.4	47.36 -.02	40.0 +0.2		63.14 .08	45.2 2.9		8.03 -.01	40.0 1.0		15.75 .22	94.2 2.8	
29.4	47.33 .04	39.6 0.4		63.03 .14	48.0 2.6		8.01 .03	40.9 0.8		15.48 .31	96.8 2.5	
May 9.4	47.27 .06	39.1 0.3		62.87 .19	50.4 2.2		7.96 .05	41.6 0.6		15.13 .39	99.2 2.2	
19.3	47.20 .08	38.6 0.6		62.66 .23	52.5 1.8		7.90 .07	42.1 0.3		14.71 .45	101.2 1.8	
29.3	47.12 -.09	38.0 +0.6		62.41 -.26	54.1 -1.4		7.82 -.09	42.3 -0.1		14.23 -.49	102.8 +1.3	
June 8.3	47.03 .09	37.4 0.6		62.13 .29	55.3 0.9		7.73 .10	42.3 +0.1		13.72 .52	103.8 0.8	
18.3	46.94 .10	36.8 0.6		61.82 .31	56.0 -0.4		7.62 .11	42.0 0.3		13.20 .53	104.4 +0.3	
28.2	46.84 .10	36.1 0.6		61.50 .32	56.2 0.0		7.51 .11	41.6 0.5		12.66 .53	104.4 -0.3	
July 8.2	46.74 .10	35.5 0.6		61.16 .33	55.9 +0.5		7.40 .12	40.9 0.7		12.13 .52	103.9 0.8	
18.2	46.64 -.09	34.9 +0.6		60.83 -.32	55.1 +1.0		7.28 -.12	40.1 +0.9		11.62 -.49	102.9 -1.3	
28.2	46.55 .09	34.3 0.5		60.52 .30	53.9 1.4		7.17 .11	39.1 1.0		11.14 .45	101.3 1.8	
Aug. 7.1	46.47 .07	33.9 0.4		60.23 .27	52.2 1.8		7.06 .10	38.0 1.1		10.71 .41	99.3 2.2	
17.1	46.40 .06	33.5 0.3		59.97 .23	50.2 2.2		6.97 .08	36.8 1.2		10.33 .35	96.9 2.6	
27.1	46.35 .04	33.3 +0.2		59.77 .17	47.9 2.4		6.90 .06	35.6 1.2		10.02 .28	94.1 3.0	
Sept. 6.0	46.32 -.01	33.2 0.0		59.63 -.10	45.3 +2.6		6.85 -.03	34.4 +1.2		9.78 -.20	91.0 -3.3	
16.0	46.33 +.02	33.3 -0.2		59.56 -.03	42.6 2.7		6.84 .00	33.3 1.1		9.62 .12	87.6 3.5	
26.0	46.37 .05	33.6 0.4		59.57 +.06	39.9 2.7		6.86 +.04	32.2 0.9		9.55 -.02	84.0 3.6	
Oct. 6.0	46.44 .09	34.2 0.7		59.67 .15	37.3 2.6		6.92 .09	31.4 0.7		9.57 +.08	80.3 3.7	
15.9	46.55 .14	35.0 1.0		59.86 .24	34.8 2.3		7.03 .14	30.8 0.4		9.70 .18	76.5 3.7	
25.9	46.71 +.18	36.1 -1.2		60.14 +.32	32.7 +1.9		7.19 +.18	30.6 +0.1		9.93 +.29	72.8 -3.7	
Nov. 4.9	46.91 .22	37.5 1.5		60.51 .40	30.9 1.5		7.39 .23	30.7 -0.3		10.27 .39	69.2 3.5	
14.9	47.15 .26	39.1 1.7		60.96 .48	29.6 1.0		7.64 .27	31.1 0.7		10.71 .48	65.8 3.2	
24.8	47.42 .29	40.9 1.9		61.47 .53	28.9 +0.5		7.93 .30	32.0 1.0		11.25 .57	62.7 2.9	
Dec. 4.8	47.72 .31	42.9 2.0		62.04 .57	28.7 -0.1		8.25 .33	33.2 1.4		11.86 .64	60.0 2.5	
14.8	48.04 +.33	44.9 -2.1		62.63 +.59	29.2 -0.7		8.59 +.35	34.7 -1.7		12.54 +.70	57.7 -2.0	
24.7	48.37 .33	47.1 2.2		63.24 .60	30.2 1.3		8.95 .35	36.6 2.0		13.27 .73	56.1 1.4	
34.7	48.70 +.33	49.2 -2.2		63.84 +.60	31.7 -1.8		9.30 +.36	38.6 -2.8		14.02 +.74	55.0 -0.8	

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Majoris.		$\delta$ Leonis.		$\delta$ Crateris.		$\tau$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 10 57	° ' " +62 17	h m 11 8	° ' " +21 4	h m 11 14	° ' " -14 13	h m 11 22	° ' " +3 24
(Dec. 30.7)	32.46 +57	23.2 -0.1	45.95 +34	22.5 -1.6	18.98 +33	59.1 -2.4	46.09 +33	35.5 -2.1
Jan. 9.7	33.01 .52	23.4 +0.5	46.27 .31	21.1 1.3	19.29 .30	61.5 2.4	46.40 .30	33.5 1.9
19.6	33.50 .46	24.2 1.0	46.57 .28	20.0 0.9	19.57 .27	63.9 2.4	46.69 .27	31.6 1.7
29.6	33.92 .38	25.5 1.5	46.83 .24	19.3 0.6	19.82 .23	66.3 2.3	46.94 .23	30.0 1.5
Feb. 8.6	34.26 .29	27.2 1.9	47.04 .19	18.9 -0.2	20.03 .18	68.5 2.1	47.15 .19	28.6 1.2
18.5	34.51 +.20	29.3 +2.3	47.20 +.14	18.8 +0.1	20.18 +.14	70.6 -1.9	47.32 +.15	27.5 -0.9
28.5	34.67 .10	31.7 2.5	47.32 .09	19.1 0.4	20.30 .09	72.4 1.7	47.45 .10	26.7 0.7
Mar. 10.5	34.72 +.01	34.3 2.6	47.39 +.04	19.6 0.7	20.37 .05	74.0 1.5	47.53 .06	26.2 0.4
20.5	34.69 -.08	36.9 2.6	47.41 .00	20.4 0.8	20.39 +.01	75.4 1.2	47.56 +.02	25.9 -0.2
30.4	34.57 .16	39.5 2.5	47.39 -.04	21.3 1.0	20.38 -.02	76.5 1.0	47.56 -.02	25.8 0.0
Apr. 9.4	34.38 -.22	41.9 +2.3	47.34 -.07	22.4 +1.0	20.34 -.05	77.3 -0.7	47.53 -.04	25.9 +0.2
19.4	34.12 .28	44.1 2.0	47.26 .09	23.4 1.0	20.28 .07	77.9 0.5	47.48 .06	26.2 0.3
29.3	33.82 .32	45.9 1.6	47.16 .11	24.5 1.0	20.20 -.09	78.3 -0.2	47.40 .08	26.6 0.4
May 9.3	33.49 .34	47.3 1.2	47.05 .12	25.5 0.9	20.10 .10	78.4 0.0	47.31 .09	27.1 0.5
19.3	33.14 .35	48.3 0.7	46.93 .12	26.3 0.8	19.99 .11	78.3 +0.2	47.21 .10	27.7 0.6
29.3	32.79 -.35	48.8 +0.3	46.81 -.12	27.1 +0.7	19.89 -.11	78.1 +0.4	47.11 -.10	28.3 +0.6
June 8.2	32.44 .34	48.8 -0.2	46.69 .12	27.7 0.5	19.78 .11	77.6 0.5	47.01 .10	28.9 0.6
18.2	32.11 .31	48.4 0.7	46.57 .11	28.2 0.3	19.67 .10	77.0 0.7	46.91 .10	29.5 0.6
28.2	31.81 .28	47.5 1.1	46.47 .10	28.4 +0.2	19.57 .10	76.2 0.9	46.81 .09	30.1 0.6
July 8.2	31.55 .25	46.1 1.6	46.38 .08	28.5 0.0	19.48 .09	75.3 1.0	46.72 .08	30.7 0.5
18.1	31.32 -.20	44.3 -2.0	46.30 -.07	28.4 -0.2	19.39 -.07	74.2 +1.1	46.65 -.07	31.2 +0.4
28.1	31.14 .15	42.2 2.3	46.24 .05	28.0 0.4	19.33 .06	73.1 1.1	46.59 .05	31.6 0.4
Aug. 7.1	31.01 .10	39.7 2.6	46.20 -.03	27.5 0.6	19.28 .04	72.0 1.1	46.54 .03	32.0 0.3
17.0	30.94 -.04	36.9 2.9	46.19 .00	26.8 0.8	19.25 -.01	70.9 1.1	46.52 -.01	32.2 +0.1
27.0	30.93 +.02	33.9 3.1	46.20 +.02	25.8 1.0	19.25 +.01	69.9 1.0	46.51 +.01	32.2 0.0
Sept. 6.0	30.98 +.05	30.8 -3.2	46.24 +.06	24.7 -1.3	19.28 +.04	69.0 +0.8	46.53 +.04	32.2 -0.1
15.9	31.09 .15	27.5 3.3	46.31 .09	23.3 1.5	19.34 .08	68.2 0.6	46.59 .07	31.8 0.4
25.9	31.28 .22	24.1 3.5	46.41 .13	21.7 1.7	19.44 .12	67.7 0.4	46.68 .11	31.3 0.7
Oct. 5.9	31.53 .28	20.8 3.3	46.56 .16	19.9 1.9	19.58 .16	67.5 +0.1	46.80 .14	30.5 0.9
15.9	31.84 .35	17.5 3.2	46.74 .20	18.0 2.0	19.76 .20	67.6 -0.3	46.97 .18	29.4 1.2
25.9	32.23 +.42	14.4 -3.0	46.96 +.24	15.9 -2.1	19.97 +.24	68.0 -0.6	47.17 +.22	28.1 -1.4
Nov. 4.8	32.68 .47	11.5 2.7	47.22 .27	13.7 2.2	20.23 .27	68.8 1.0	47.41 .26	26.6 1.7
14.8	33.18 .52	8.9 2.4	47.51 .30	11.5 2.2	20.51 .30	70.0 1.3	47.68 .29	24.8 1.9
24.8	33.72 .56	6.8 2.0	47.83 .33	9.2 2.2	20.82 .32	71.5 1.7	47.98 .31	22.8 2.0
Dec. 4.7	34.29 .58	5.0 1.5	48.17 .34	7.1 2.1	21.15 .33	73.4 2.0	48.31 .32	20.8 2.1
14.7	34.88 +.59	3.8 -1.0	48.51 +.36	5.0 -1.9	21.49 +.34	75.4 -2.2	48.63 +.33	18.6 -2.2
24.7	35.47 .58	3.1 -0.4	48.86 .34	3.2 1.7	21.83 .33	77.7 2.3	48.96 .33	16.5 2.1
34.7	36.05 +.55	3.0 +0.2	49.19 +.33	1.6 -2.5	22.15 +.31	80.1 -2.4	49.28 +.31	14.4 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Trianguli Australis.		$\eta$ Herculis.		$\kappa$ Ophiuchi.		$\epsilon$ Ursæ Minoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 16 37	<sup>°</sup> <sup>'</sup> -68 50	<sup>h</sup> <sup>m</sup> 16 39	<sup>°</sup> <sup>'</sup> +39 6	<sup>h</sup> <sup>m</sup> 16 52	<sup>°</sup> <sup>'</sup> + 9 31	<sup>h</sup> <sup>m</sup> 16 56	<sup>°</sup> <sup>'</sup> +82 11
	"	"	"	"	"	"	"	"
(Dec. 30.9)	57.01 +.55	26.1 +1.9	25.15 +.22	40.5 -3.2	53.00 +.21	49.5 -2.1	7.63+ .50	61.4 -3.3
Jan. 9.9	57.61 .63	24.3 1.5	25.40 .27	37.5 2.9	53.23 .24	47.4 2.0	8.29 .78	58.2 3.0
19.8	58.28 .70	23.0 1.1	25.68 .30	34.7 2.6	53.48 .26	45.5 1.9	9.22 1.04	55.3 2.6
29.8	59.01 .75	22.1 0.7	26.00 .32	32.4 2.1	53.76 .28	43.7 1.6	10.39 1.25	52.9 2.2
Feb. 8.8	59.77 .78	21.6 +0.3	26.33 .34	30.5 1.6	54.05 .29	42.2 1.3	11.75 1.42	51.0 1.6
18.8	60.55 +.79	21.5 -0.1	26.68 +.35	29.1 -1.0	54.35 +.30	41.1 -1.0	13.26+1.53	49.7 -1.0
28.7	61.34 .78	21.8 0.5	27.03 .35	28.4 -0.4	54.65 .30	40.2 0.6	14.85 1.58	49.0 -0.3
Mar. 10.7	62.12 .76	22.5 0.9	27.37 .34	28.2 +0.2	54.94 .29	39.8 -0.2	16.46 1.57	49.0 +0.3
20.7	62.87 .73	23.5 1.2	27.70 .32	28.7 0.7	55.23 .28	39.7 +0.2	18.03 1.51	49.7 1.0
30.7	63.58 .69	24.9 1.5	28.01 .30	29.7 1.3	55.51 .27	40.1 0.5	19.51 1.39	51.0 1.6
Apr. 9.6	64.25 +.64	26.6 -1.8	28.30 +.27	31.2 +1.8	55.77 +.25	40.8 +0.9	20.84+1.22	52.8 +2.1
19.6	64.86 .58	28.6 2.1	28.55 .24	33.2 2.2	56.01 .23	41.8 1.2	21.97 1.01	55.1 2.5
29.6	65.40 .51	30.7 2.2	28.77 .20	35.6 2.5	56.22 .20	43.1 1.4	22.88 .78	57.8 2.9
May 9.5	65.87 .43	33.0 2.4	28.96 .16	38.3 2.7	56.41 .18	44.6 1.6	23.53 .52	60.8 3.1
19.5	66.25 .34	35.5 2.5	29.10 .12	41.1 2.9	56.57 .15	46.3 1.7	23.91+ .24	64.0 3.2
29.5	66.55 +.25	38.0 -2.5	29.20 +.08	44.0 +2.9	56.71 +.12	48.1 +1.8	24.01- .04	67.3 +3.3
June 8.5	66.75 .15	40.5 2.5	29.26 +.03	47.0 2.9	56.81 .08	49.8 1.8	23.83 .32	70.6 3.2
18.4	66.85 +.05	43.0 2.4	29.27 -.01	49.8 2.8	56.88 .05	51.6 1.7	23.38 .58	73.8 3.1
28.4	66.85 -.05	45.4 2.3	29.24 .05	52.5 2.6	56.91 +.01	53.3 1.6	22.66 .83	76.8 2.9
July 8.4	66.75 .15	47.6 2.1	29.16 .10	54.9 2.3	56.90 -.02	54.8 1.5	21.70 1.06	79.5 2.6
18.4	66.56 -.24	49.5 -1.8	29.04 -.14	57.1 +2.0	56.65 -.06	56.2 +1.3	20.52-1.26	81.9 +2.2
28.3	66.27 .32	51.1 1.5	28.89 .17	58.9 1.6	56.78 .09	57.5 1.1	19.15 1.44	83.9 1.8
Ang. 7.3	65.91 .39	52.4 1.1	28.70 .20	60.3 1.2	56.67 .12	58.5 0.9	17.62 1.58	85.4 1.3
17.3	65.48 .45	53.3 0.6	28.48 .23	61.4 0.8	56.53 .15	59.3 0.7	15.97 1.69	86.5 0.8
27.2	65.00 .49	53.7 -0.2	28.24 .24	62.0 +0.4	56.37 .16	59.9 0.5	14.22 1.76	87.1 +0.3
Sept. 6.2	64.50 -.50	53.6 +0.3	27.99 -.25	62.2 -0.1	56.20 -.17	60.3 +0.2	12.42-1.79	87.2 -0.2
16.2	64.00 .49	53.0 0.8	27.74 .25	61.9 0.5	56.02 .18	60.4 0.0	10.61 1.78	86.8 0.7
26.2	63.51 .46	52.0 1.2	27.49 .24	61.1 1.0	55.85 .17	60.2 -0.3	8.83 1.73	85.9 1.2
Oct. 6.1	63.07 .41	50.6 1.6	27.27 .22	59.9 1.4	55.69 .15	59.8 0.5	7.12 1.64	84.5 1.6
16.1	62.70 .33	48.7 2.0	27.06 .18	58.3 1.8	55.55 .12	59.1 0.8	5.53 1.52	82.6 2.1
26.1	62.41 -.23	46.5 +2.3	26.90 -.14	56.3 -2.2	55.44 -.09	58.2 -1.1	4.09-1.33	80.3 -2.5
Nov. 5.1	62.24 -.12	44.1 2.5	26.78 .09	53.9 2.6	55.37 -.05	57.0 1.3	2.85 1.12	77.7 2.8
15.0	62.18 .00	41.5 2.6	26.71 -.04	51.1 2.9	55.34 .00	55.5 1.6	1.84 .88	74.6 3.1
25.0	62.24 +.13	38.8 2.6	26.70 +.02	48.1 3.1	55.36 +.04	53.8 1.8	1.09 .60	71.4 3.3
Dec. 5.0	62.44 .26	36.2 2.5	26.75 .08	45.0 3.2	55.43 .09	52.0 1.9	0.63- .30	67.9 3.5
14.9	62.75 +.38	33.8 +2.3	26.86 +.14	41.7 -3.3	55.55 +.14	50.0 -2.0	0.49+ .01	64.4 -3.5
24.9	63.19 .48	31.5 2.1	27.02 .19	38.4 3.2	55.71 .18	47.9 2.1	0.65 .32	60.9 3.4
34.9	63.72 +.58	29.6 +1.8	27.24 +.24	35.3 -3.1	55.91 +.22	45.7 -2.1	1.13+ .62	57.6 -3.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>d</i> Herculis.		<i>a</i> <sup>1</sup> Herculis.		<i>δ</i> Ophiuchi.		<i>β</i> Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 16 57	° ' " +33 42	h m 17 10	° ' " +14 30	h m 17 20	° ' " -24 4	h m 17 28	° ' " +52 22
(Dec. 30.9)	s 51.88 +.20	" 43.4 -3.1	s 2.16 -.20	" 13.5 -2.3	s 11.94 +.23	" 57.5 -0.1	s 7.41 +.17	" 25.8 -3.5
Jan. 9.9	52.11 .24	40.4 2.8	2.37 .23	11.3 2.2	12.18 .26	57.7 0.3	7.61 .23	22.4 3.2
19.9	52.37 .27	37.7 2.5	2.61 .25	9.2 2.0	12.45 .29	58.0 0.3	7.87 .29	19.3 3.0
29.8	52.65 .30	35.3 2.2	2.88 .27	7.3 1.8	12.75 .31	58.4 0.4	8.18 .33	16.5 2.6
Feb. 8.8	52.97 .32	33.4 1.7	3.16 .29	5.6 1.5	13.06 .32	58.7 0.4	8.53 .37	14.2 2.1
18.8	53.29 +.33	31.9 -1.2	3.45 -.30	4.4 -1.1	13.39 +.33	59.1 -0.4	8.92+ .39	12.5 -1.5
28.8	53.62 .33	31.0 -0.6	3.75 .30	3.5 0.7	13.72 .33	59.5 0.3	9.32 .41	11.2 0.9
Mar. 10.7	53.95 .32	30.7 0.0	4.05 .30	3.0 -0.2	14.05 .33	59.8 0.3	9.73 .41	10.7 -0.2
20.7	54.27 .31	31.0 +0.5	4.35 .29	3.0 +0.2	14.38 .32	60.1 0.2	10.14 .40	10.8 +0.5
30.7	54.57 .29	31.8 1.1	4.63 .28	3.5 0.6	14.70 .31	60.3 0.2	10.54 .39	11.6 1.1
Apr. 9.6	54.86 +.27	33.1 +1.6	4.90 -.26	4.3 +1.0	15.01 +.30	60.4 -0.1	10.92 +.36	13.0 +1.7
19.6	55.12 .25	34.9 2.0	5.15 .24	5.5 1.3	15.30 .28	60.5 -0.1	11.26 .33	14.9 2.2
29.6	55.35 .21	37.1 2.4	5.38 .22	7.0 1.6	15.57 .26	60.5 0.0	11.57 .29	17.3 2.6
May 9.6	55.55 .18	39.5 2.6	5.58 .19	8.7 1.8	15.82 .24	60.5 0.0	11.84 .24	20.1 2.9
19.5	55.71 .14	42.2 2.7	5.76 .16	10.6 2.0	16.04 .21	60.6 0.0	12.05 .19	23.1 3.2
29.5	55.83 +.10	45.0 +2.8	5.91 -.13	12.7 +2.1	16.23 +.17	60.6 0.0	12.21 +.13	26.4 +3.3
June 8.5	55.92 .06	47.8 2.8	6.02 .10	14.8 2.1	16.39 .14	60.6 0.0	12.32 .07	29.7 3.3
18.5	55.96 +.02	50.6 2.7	6.10 .06	16.8 2.0	16.51 .10	60.7 0.0	12.36 +.01	33.0 3.3
28.4	55.96 -.02	53.2 2.5	6.14 -.02	18.8 1.9	16.59 .06	60.7 -0.1	12.34 -.05	36.2 3.1
July 8.4	55.92 .06	55.6 2.3	6.14 +.02	20.6 1.8	16.63 +.02	60.8 0.1	12.27 .10	39.3 2.9
18.4	55.83 -.10	57.8 +2.0	6.10 +.06	22.3 +1.6	16.62 -.03	60.9 -0.1	12.14 -.16	42.1 +2.6
28.3	55.71 .14	59.7 1.7	6.03 .09	23.8 1.3	16.57 .07	61.0 -0.1	11.95 .21	44.5 2.3
Aug. 7.3	55.55 .17	61.3 1.4	5.92 .12	25.0 1.1	16.48 .10	61.0 0.0	11.71 .26	46.6 1.9
17.3	55.36 .20	62.5 1.0	5.79 .15	26.0 0.9	16.36 .13	61.0 0.0	11.44 .29	48.2 1.4
27.3	55.15 .22	63.3 +0.6	5.63 .17	26.7 0.6	16.21 .16	61.0 +0.1	11.13 .32	49.4 1.0
Sept. 6.2	54.92 -.23	63.6 +0.2	5.45 +.18	27.2 +0.3	16.04 -.18	60.9 +0.2	10.79 -.34	50.2 +0.5
16.2	54.69 .23	63.6 -0.3	5.26 .18	27.4 0.0	15.86 .18	60.7 0.2	10.44 .35	50.4 0.0
26.2	54.46 .22	63.1 0.7	5.08 .18	27.2 -0.3	15.68 .18	60.4 0.3	10.09 .35	50.1 -0.5
Oct. 6.2	54.25 .21	62.2 1.1	4.91 .16	26.8 0.6	15.51 .16	60.1 0.3	9.74 .33	49.3 1.0
16.1	54.05 .18	60.9 1.5	4.75 .14	26.0 0.9	15.35 .14	59.7 0.4	9.42 .30	48.1 1.5
26.1	53.89 -.14	59.2 -1.9	4.62 +.11	25.0 -1.2	15.23 -.10	59.3 +0.4	9.13 -.26	46.3 -2.0
Nov. 5.1	53.77 .10	57.1 2.3	4.53 .07	23.6 1.5	15.15 .06	59.0 0.4	8.89 .21	44.1 2.4
15.0	53.69 -.05	54.6 2.6	4.49 +0.3	22.0 1.7	15.11 -.01	58.6 0.3	8.71 .15	41.4 2.8
25.0	53.67 +.01	51.9 2.8	4.48 -.02	20.2 1.9	15.13 +.04	58.3 0.2	8.58 .09	38.5 3.1
Dec. 5.0	53.71 .06	49.0 3.0	4.53 .07	18.1 2.1	15.20 .09	58.1 +0.1	8.53 -.02	35.2 3.3
15.0	53.80 +.12	45.9 -3.1	4.63 -.12	15.9 -2.2	15.32 +.14	58.0 0.0	8.55 +.05	31.8 -3.5
24.9	53.94 .17	42.9 3.1	4.77 .16	13.6 2.3	15.49 .19	58.1 -0.1	8.64 .12	28.3 3.5
34.9	54.14 +.22	39.8 -3.0	4.95 -.20	11.4 -2.3	15.70 +.23	58.2 -0.2	8.80 +.19	24.8 -3.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ophiuchi.		$\omega$ Draconis.		$\mu$ Herculis.		$\psi$ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 17 30	° ' " +12 37	h m 17 37	° ' " +68 47	h m 17 42	° ' " +27 46	h m 17 43	° ' " +72 11
(Dec. 30.9)	14.38 +.18	55.8 -2.2	28.88 +.16	69.6 -3.6	29.69 +.15	41.3 -2.8	39.29 +.15	47.7 -3.6
Jan. 9.9	14.57 .21	53.7 2.1	29.10 .27	66.1 3.4	29.87 .19	38.5 2.7	39.51 .28	44.2 3.4
19.9	14.80 .24	51.6 1.9	29.43 .37	62.9 3.1	30.08 .23	35.9 2.5	39.85 .41	40.9 3.1
29.9	15.05 .26	49.7 1.7	29.85 .46	60.0 2.7	30.33 .26	33.5 2.2	40.32 .52	38.0 2.7
Feb. 8.8	15.32 .28	48.2 1.4	30.36 .54	57.6 2.2	30.60 .28	31.5 1.8	40.88 .61	35.5 2.2
18.8	15.61 +.29	46.9 -1.1	30.93 +.39	55.7 -1.6	30.89 +.30	29.9 -1.4	41.53 +.68	33.6 -1.6
28.8	15.90 .30	46.0 0.7	31.54 .63	54.4 0.9	31.20 .31	28.7 0.9	42.24 .72	32.2 1.0
Mar. 10.7	16.20 .30	45.5 -0.3	32.18 .64	53.8 -0.3	31.51 .31	28.1 -0.3	42.98 .74	31.5 -0.3
20.7	16.49 .29	45.4 +0.1	32.83 .64	53.9 +0.4	31.82 .31	28.0 +0.2	43.73 .74	31.5 +0.3
30.7	16.78 .28	45.8 0.6	33.46 .61	54.6 1.1	32.12 .30	28.5 0.7	44.46 .72	32.2 1.0
Apr. 9.7	17.06 +.27	46.6 +0.9	34.05 +.57	56.0 +1.7	32.42 +.29	29.4 +1.2	45.16 +.67	33.5 +1.6
19.6	17.32 .25	47.7 1.3	34.59 .51	58.0 2.2	32.70 .27	30.9 1.6	45.80 .60	35.4 2.1
29.6	17.56 .23	49.1 1.5	35.06 .44	60.4 2.6	32.96 .25	32.7 2.0	46.35 .51	37.7 2.6
May 9.6	17.79 .21	50.8 1.8	35.46 .35	63.2 3.0	33.19 .22	34.9 2.3	46.82 .41	40.5 2.9
19.6	17.98 .18	52.6 1.9	35.77 .26	66.4 3.3	33.40 .19	37.3 2.5	47.18 .30	43.6 3.2
29.5	18.15 +.15	54.6 +2.0	35.98 +.16	69.8 +3.4	33.57 +.15	39.9 +2.6	47.43 +.19	46.9 +3.4
June 8.5	18.28 .12	56.6 2.0	36.09 +.06	73.2 3.5	33.70 .12	42.6 2.7	47.55 .06	50.3 3.4
18.5	18.38 .08	58.7 2.0	36.09 -.04	76.7 3.4	33.80 .07	45.3 2.7	47.56 -.06	53.8 3.4
28.4	18.44 +.04	60.6 1.9	36.00 .15	80.1 3.3	33.85 +.03	47.9 2.6	47.44 .18	57.2 3.3
July 8.4	18.46 .00	62.5 1.8	35.80 .24	83.3 3.1	33.86 -.01	50.4 2.4	47.20 .29	60.4 3.1
18.4	18.44 -.04	64.2 +1.6	35.51 -.33	86.2 +2.8	33.83 -.05	52.7 +2.2	46.85 -.40	63.3 +2.8
28.4	18.39 .07	65.7 1.4	35.13 .42	88.8 2.4	33.76 .09	54.8 1.9	46.40 .50	66.0 2.5
Aug. 7.3	18.29 .11	67.0 1.2	34.68 .49	91.0 2.0	33.64 .13	56.5 1.6	45.85 .60	68.3 2.1
17.3	18.17 .14	68.0 0.9	34.15 .55	92.8 1.6	33.49 .16	58.0 1.3	45.23 .67	70.1 1.6
27.3	18.02 .16	68.8 0.7	33.57 .60	94.2 1.1	33.32 .19	59.1 0.9	44.54 .72	71.5 1.2
Sept. 6.3	17.85 -.18	69.3 +0.4	32.96 -.65	95.0 +0.6	33.12 -.21	59.8 +0.5	43.80 -.76	72.4 +0.7
16.2	17.67 .18	69.6 +0.1	32.32 .64	95.4 +0.1	32.90 .22	60.2 +0.2	43.03 .77	72.8 +0.2
26.2	17.48 .18	69.5 -0.2	31.67 .64	95.2 -0.5	32.68 .22	60.2 -0.2	42.25 .77	72.7 -0.4
Oct. 6.2	17.30 .17	69.2 0.5	31.03 .62	94.5 1.0	32.47 .21	59.8 0.6	41.48 .75	72.1 0.9
16.1	17.14 .15	68.6 0.8	30.43 .58	93.2 1.5	32.27 .19	58.9 1.0	40.74 .71	70.9 1.4
26.1	17.00 -.12	67.7 -1.0	29.87 -.52	91.5 -2.0	32.10 -.16	57.7 -1.4	40.06 -.64	69.3 -1.9
Nov. 5.1	16.90 .08	66.6 1.3	29.38 .45	89.3 2.4	31.96 .12	56.1 1.8	39.45 .56	67.1 2.4
15.1	16.84 -.04	65.1 1.6	28.97 .36	86.6 2.8	31.86 .08	54.2 2.1	38.94 .46	64.5 2.8
25.0	16.82 +.01	63.5 1.8	28.66 .26	83.6 3.1	31.81 -.03	51.9 2.4	38.53 .34	61.6 3.1
Dec. 5.0	16.85 .05	61.6 2.0	28.46 .15	80.3 3.4	31.80 +.02	49.4 2.6	38.25 .21	58.4 3.4
15.0	16.93 +.10	59.5 -2.1	28.37 -.05	76.8 -3.5	31.85 +.07	46.7 -2.8	38.11 -.08	54.9 -3.5
25.0	17.06 .15	57.4 2.2	28.40 +.09	73.3 3.6	31.94 .12	43.9 2.8	38.10 +.06	51.3 3.6
34.9	17.22 +.19	55.2 -2.2	28.55 +.21	69.7 -3.5	32.09 +.17	41.1 -2.8	38.23 +.20	47.8 -3.6



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Draconis.		$\gamma^2$ Sagittarii.		$\mu$ Sagittarii.		$\eta$ Serpentis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 17 54	° ' " +51 29	h m 17 59	° ' " -30 25	h m 18 7	° ' " -21 5	h m 18 16	° ' " -2 55
Jan. 0.0	13.98 +.13	57.2 -3.5	18.94 +.19	32.3 +0.5	43.18 +.17	8.3 -0.1	4.73 +.14	31.0 -1.2
9.9	14.14 .19	53.8 3.3	19.15 .23	31.9 0.4	43.37 .21	8.4 0.1	4.89 .18	32.2 1.2
19.9	14.36 .25	50.5 3.1	19.40 .27	31.6 0.3	43.59 .24	8.6 0.2	5.09 .21	33.4 1.1
29.9	14.64 .30	47.6 2.7	19.68 .30	31.4 0.2	43.85 .27	8.7 0.2	5.31 .24	34.5 1.0
Feb. 8.9	14.96 .34	45.1 2.3	19.99 .32	31.2 0.2	44.13 .29	8.9 0.2	5.56 .26	35.5 0.9
18.8	15.32 +.37	43.1 -1.7	20.31 +.33	31.0 +0.1	44.42 +.30	9.0 -0.1	5.82 +.27	36.3 -0.7
28.8	15.70 .39	41.7 1.1	20.65 .34	30.9 0.1	44.73 .31	9.1 0.0	6.10 .28	36.8 0.4
Mar. 10.8	16.10 .40	40.9 -0.5	21.00 .34	30.9 0.1	45.05 .32	9.1 +0.1	6.39 .29	37.1 -0.1
20.8	16.50 .40	40.7 +0.2	21.34 .34	30.8 0.1	45.37 .32	9.0 0.2	6.68 .29	37.1 +0.1
30.7	16.90 .39	41.2 0.8	21.69 .34	30.7 +0.1	45.69 .32	8.8 0.2	6.98 .29	36.8 0.4
Apr. 9.7	17.29 +.37	42.4 +1.4	22.02 +.33	30.6 0.0	46.00 +.31	8.5 +0.3	7.27 +.29	36.3 +0.6
19.7	17.65 .35	44.1 1.9	22.35 .32	30.6 0.0	46.31 .30	8.2 0.4	7.55 .28	35.6 0.9
29.6	17.98 .31	46.3 2.4	22.66 .30	30.6 0.0	46.60 .29	7.8 0.4	7.82 .27	34.6 1.1
May 9.6	18.28 .27	48.9 2.8	22.96 .28	30.7 -0.1	46.88 .27	7.4 0.4	8.08 .25	33.4 1.2
19.6	18.52 .22	51.9 3.1	23.23 .25	30.8 0.1	47.14 .24	7.0 0.4	8.32 .23	32.2 1.3
June 29.6	18.72 +.17	55.1 +3.3	23.47 +.22	30.9 -0.2	47.37 +.21	6.6 +0.4	8.53 +.20	30.9 +1.4
8.5	18.87 .11	58.4 3.4	23.67 .19	31.1 0.3	47.57 .18	6.2 0.3	8.72 .17	29.5 1.4
18.5	18.95 +.05	61.8 3.3	23.84 .14	31.4 0.3	47.73 .14	5.9 0.3	8.87 .13	28.1 1.3
28.5	18.98 .00	65.1 3.2	23.96 .10	31.7 0.4	47.85 .10	5.7 0.2	8.98 .09	26.8 1.2
July 8.4	18.94 -0.6	68.3 3.1	24.04 .06	32.1 0.4	47.93 .06	5.5 0.1	9.06 .05	25.6 1.1
18.4	18.85 -.12	71.3 +2.8	24.07 +.01	32.5 -0.4	47.97 +.01	5.4 +0.1	9.09 +0.1	24.5 +1.0
28.4	18.70 .18	73.9 2.5	24.05 -0.4	33.0 0.4	47.96 -0.3	5.4 0.0	9.08 -0.3	23.6 0.9
Aug. 7.4	18.49 .23	76.3 2.1	23.99 .08	33.4 0.4	47.91 .07	5.4 0.0	9.03 .07	22.8 0.8
17.3	18.24 .27	78.2 1.7	23.88 .12	33.8 0.3	47.82 .11	5.4 0.0	8.95 .10	22.1 0.6
27.3	17.95 .30	79.7 1.3	23.74 .16	34.1 0.2	47.69 .14	5.4 0.0	8.83 .13	21.5 0.5
Sept. 6.3	17.63 -.33	80.8 +0.8	23.57 -.18	34.3 -0.1	47.54 -.16	5.4 0.0	8.68 -.16	21.2 +0.3
16.3	17.29 .34	81.4 +0.3	23.38 .19	34.3 -0.0	47.36 .18	5.4 0.0	8.52 .17	20.9 +0.2
26.2	16.95 .35	81.5 -0.2	23.19 .19	34.2 +0.1	47.18 .18	5.3 +0.1	8.34 .17	20.8 0.0
Oct. 6.2	16.60 .34	81.1 0.7	22.99 .19	34.0 0.3	47.00 .17	5.2 0.1	8.17 .17	20.9 -0.1
16.2	16.27 .31	80.1 1.2	22.81 .17	33.7 0.4	46.83 .16	5.1 0.1	8.01 .15	21.0 0.2
Nov. 26.2	15.98 -.28	78.6 -1.7	22.66 -.14	33.3 +0.5	46.69 -.13	5.0 +0.2	7.86 -.13	21.4 -0.4
5.1	15.72 .23	76.7 2.1	22.54 .10	32.7 0.6	46.57 .09	4.8 0.2	7.74 .10	21.9 0.6
15.1	15.51 .18	74.4 2.5	22.46 -.05	32.1 0.6	46.50 .05	4.6 0.1	7.66 .06	22.5 0.7
25.1	15.36 .12	71.7 2.9	22.44 .00	31.5 0.6	46.47 -.01	4.5 0.1	7.62 -.02	23.3 0.9
Dec. 5.0	15.27 -.05	68.6 3.2	22.47 +0.5	30.9 0.6	46.49 +0.4	4.4 +0.1	7.62 +0.2	24.2 1.0
15.0	15.25 +0.2	65.3 -3.4	22.55 +1.0	30.3 +0.5	46.55 +0.9	4.4 0.0	7.67 +0.7	25.3 -1.1
25.0	15.30 .08	61.9 3.4	22.68 .16	29.8 0.5	46.67 .14	4.4 -0.1	7.76 .11	26.4 1.2
35.0	15.42 +.15	58.4 -3.4	22.86 +.21	29.3 +0.4	46.83 +.18	4.5 -0.1	7.89 +.15	27.6 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Aquilæ.		$\alpha$ Lyræ. ( <i>Vega</i> .)		$\beta$ Lyræ.		$\sigma$ Sagittarii.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 18 29	° ' " — 8 18	h m 18 33	° ' " +38 41	h m 18 46	° ' " +33 14	h m 18 48	° ' " — 26 25
	s	"	s	"	s	"	s	"
Jan. 0.0	42.42 +.14	55.0 -0.9	30.10 +.09	20.8 -3.1	20.20 +.08	42.3 -2.9	59.94 +.14	21.5 +0.4
10.0	42.57 .17	55.8 0.8	30.21 .14	17.7 3.0	20.31 .12	39.4 2.8	60.10 .17	21.1 0.4
19.9	42.76 .20	56.6 0.8	30.38 .18	14.8 2.9	20.45 .17	36.6 2.7	60.29 .21	20.7 0.4
29.9	42.98 .23	57.4 0.7	30.58 .22	12.0 2.6	20.64 .21	34.0 2.5	60.52 .24	20.3 0.4
Feb. 8.9	43.22 .25	58.1 0.6	30.83 .26	9.5 2.3	20.87 .24	31.6 2.2	60.77 .27	20.0 0.4
18.8	43.48 +.27	58.6 -0.4	31.10 +.29	7.5 -1.8	21.12 +.27	29.6 -1.8	61.05 +.29	19.6 +0.4
28.8	43.76 .28	58.9 -0.2	31.41 .31	5.9 1.3	21.40 .29	28.1 1.3	61.35 .31	19.2 0.4
Mar. 10.8	44.05 .29	59.1 0.0	31.73 .33	4.9 0.7	21.71 .31	27.1 0.7	61.66 .32	18.8 0.4
20.8	44.34 .29	59.0 +0.2	32.06 .34	4.4 -0.1	22.02 .32	26.6 -0.2	61.99 .33	18.3 0.4
30.7	44.64 .30	58.7 0.4	32.40 .34	4.6 +0.5	22.34 .32	26.7 +0.4	62.32 .33	17.8 0.5
Apr. 9.7	44.94 +.29	58.1 +0.6	32.74 +.33	5.3 +1.0	22.66 +.32	27.4 +0.9	62.65 +.33	17.3 +0.5
19.7	45.23 .29	57.4 0.8	33.07 .32	6.7 1.6	22.98 .31	28.5 1.4	62.98 .33	16.7 0.5
29.7	45.52 .28	56.5 0.9	33.38 .30	8.5 2.0	23.29 .30	30.2 1.9	63.30 .32	16.2 0.5
May 9.6	45.79 .26	55.5 1.0	33.67 .28	10.7 2.4	23.58 .28	32.3 2.3	63.62 .30	15.7 0.5
19.6	46.04 .24	54.4 1.1	33.94 .25	13.3 2.7	23.84 .25	34.8 2.6	63.91 .28	15.2 0.4
29.6	46.27 +.21	53.3 +1.1	34.17 +.21	16.2 +3.0	24.08 +.22	37.5 +2.8	64.18 +.26	14.8 +0.3
June 8.5	46.47 .18	52.2 1.1	34.36 .17	19.3 3.1	24.28 .18	40.4 2.9	64.42 .23	14.6 0.2
18.5	46.64 .15	51.1 1.1	34.50 .12	22.4 3.2	24.44 .14	43.4 3.0	64.63 .19	14.4 +0.1
28.5	46.78 .11	50.0 1.0	34.60 .07	25.6 3.1	24.56 .09	46.4 3.0	64.80 .15	14.4 0.0
July 8.5	46.87 .07	49.1 0.9	34.65 +0.2	28.7 3.0	24.63 +0.5	49.4 2.9	64.93 .10	14.4 -0.1
18.4	46.92 +0.3	48.2 +0.8	34.65 -0.3	31.6 +2.8	24.65 .05	52.2 +2.7	65.01 +0.5	14.6 -0.2
28.4	46.93 -0.1	47.5 0.7	34.60 .08	34.4 2.6	24.62 -0.5	54.8 2.5	65.03 .00	14.8 0.3
Aug. 7.4	46.89 .05	46.9 0.6	34.49 .12	36.8 2.3	24.55 .09	57.3 2.3	65.01 -0.4	15.2 0.3
17.4	46.82 .09	46.4 0.4	34.35 .16	39.0 2.0	24.43 .14	59.4 2.0	64.95 .08	15.4 0.3
27.3	46.71 .12	46.0 0.3	34.16 .20	40.8 1.6	24.28 .17	61.1 1.6	64.85 .12	15.7 0.3
Sept. 6.3	46.57 -0.15	45.7 +0.2	33.95 -0.23	42.2 +1.2	24.09 -0.20	62.5 +1.2	64.71 -0.15	16.0 -0.3
16.3	46.41 .17	45.6 +0.1	33.71 .25	43.2 0.8	23.88 .22	63.5 0.8	64.54 .17	16.3 0.2
26.2	46.24 .17	45.5 0.0	33.45 .26	43.7 +0.3	23.65 .23	64.1 +0.4	64.36 .19	16.5 -0.1
Oct. 6.2	46.06 .17	45.5 -0.1	33.19 .26	43.7 -0.2	23.41 .23	64.3 -0.1	64.17 .19	16.6 0.0
16.2	45.89 .16	45.6 0.2	32.94 .24	43.3 0.6	23.18 .22	64.0 0.5	63.98 .18	16.6 +0.1
26.2	45.75 -0.14	45.9 -0.2	32.71 -0.22	42.4 -1.1	22.96 -0.20	63.3 -0.9	63.81 -0.16	16.5 +0.2
Nov. 5.1	45.62 .11	46.2 0.3	32.50 .19	41.1 1.5	22.77 .18	62.2 1.3	63.67 .13	16.3 0.2
15.1	45.54 .07	46.5 0.4	32.33 .15	39.4 1.9	22.61 .14	60.6 1.7	63.56 .09	16.0 0.3
25.1	45.49 -0.03	47.0 0.6	32.20 .10	37.2 2.3	22.49 .10	58.7 2.1	63.49 -0.04	15.7 0.3
Dec. 5.1	45.48 +0.2	47.7 0.7	32.12 -0.05	34.7 2.6	22.42 -0.05	56.4 2.4	63.47 .00	15.3 0.4
15.0	45.52 +0.06	48.4 -0.7	32.09 .00	31.9 -2.9	22.39 .00	53.9 -2.6	63.50 +0.05	14.9 +0.4
25.0	45.60 .10	49.2 0.8	32.11 +0.05	28.9 3.0	22.41 +0.05	51.1 2.8	63.58 .10	14.5 0.4
35.0	45.73 +.15	50.0 -0.8	32.19 +.11	25.9 -3.1	22.48 +0.09	48.3 -2.9	63.70 +.15	14.1 +0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	50 Draconis.		σ Octantia.		ζ Aquilæ.		δ Sagittarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 18 49	<sup>°</sup> <sup>'</sup> +75 18	<sup>h</sup> 18	<sup>°</sup> <sup>'</sup> -89 15	<sup>h</sup> <sup>m</sup> 19 0	<sup>°</sup> <sup>'</sup> +13 42	<sup>h</sup> <sup>m</sup> 19 11	<sup>°</sup> <sup>'</sup> -19 7
Jan. 0.0	31.79 -07	55.0 -3.4	56 56.1 + 3.1	23.2 +3.6	45.64 +.08	47.6 -2.0	43.34 +.10	58.8 0.0
10.0	31.79 +.08	51.5 3.4	57 0.5 6.0	19.7 3.5	45.75 .12	45.6 2.0	43.46 .14	58.8 0.0
20.0	31.95 .24	48.1 3.3	57 8.0 8.9	16.3 3.3	45.89 .16	43.6 1.9	43.62 .18	58.8 0.0
29.9	32.27 .40	44.9 3.1	57 18.3 11.6	13.1 3.1	46.06 .19	41.8 1.7	43.81 .21	58.8 +0.1
Feb. 8.9	32.74 .54	41.9 2.8	57 31.2 14.0	10.2 2.8	46.27 .22	40.2 1.5	44.03 .23	58.7 0.1
18.9	33.34 +.66	39.4 -2.3	57 46.2 +15.9	7.6 +2.4	46.50 +.24	38.8 -1.2	44.28 +.26	58.5 +0.2
28.8	34.06 .76	37.3 1.8	58 2.9 17.4	5.4 2.0	46.75 .26	37.8 0.8	44.55 .28	58.2 0.3
Mar. 10.8	34.86 .83	35.8 1.2	58 20.9 18.6	3.7 1.5	47.02 .28	37.2 -0.4	44.83 .29	57.9 0.4
20.8	35.72 .87	35.0 -0.5	58 39.9 19.3	2.4 1.0	47.30 .29	37.0 0.0	45.13 .30	57.4 0.6
30.8	36.60 .89	34.8 +0.1	58 59.3 19.6	1.6 0.6	47.59 .29	37.2 +0.4	45.44 .31	56.7 0.7
Apr. 9.7	37.49 +.87	35.2 +0.8	59 18.9 +19.4	1.3 +0.1	47.89 +.29	37.8 +0.8	45.75 +.31	56.0 +0.3
19.7	38.34 .83	36.3 1.4	59 38.1 18.9	1.5 -0.4	48.18 .29	38.8 1.2	46.07 .31	55.2 0.8
29.7	39.14 .76	38.0 1.9	59 56.5 18.0	2.1 0.9	48.47 .28	40.2 1.5	46.38 .31	54.4 0.9
May 9.7	39.86 .67	40.2 2.4	60 13.9 16.7	3.3 1.3	48.75 .27	41.9 1.8	46.69 .30	53.5 0.9
19.6	40.47 .56	42.9 2.8	60 29.9 15.1	4.8 1.7	49.01 .25	43.8 2.0	46.98 .28	52.6 0.9
29.6	40.97 +.43	45.9 +3.1	60 44.0 +13.1	6.7 -2.1	49.25 +.23	45.9 +2.2	47.25 +.26	51.8 +0.8
June 8.6	41.33 .29	49.2 3.4	60 56.0 10.9	9.0 2.4	49.46 .20	48.2 2.3	47.50 .23	51.0 0.7
18.5	41.56 +.15	52.7 3.5	61 5.6 8.3	11.5 2.6	49.64 .16	50.5 2.3	47.72 .20	50.3 0.6
28.4	41.63 .00	56.2 3.5	61 12.6 5.6	14.3 2.8	49.79 .12	52.8 2.2	47.90 .16	49.7 0.5
July 8.4	41.56 -15	59.7 3.5	61 16.7 + 2.7	17.2 2.9	49.89 .08	55.0 2.2	48.04 .12	49.3 0.4
18.4	41.34 -29	63.1 +3.3	61 18.0 - 0.3	20.2 -2.9	49.95 +.04	57.1 +2.0	48.13 +.07	49.0 +0.3
28.4	40.98 .43	66.3 3.1	61 16.2 3.3	23.1 2.8	49.97 .00	59.0 1.8	48.18 +.03	48.8 +0.1
Aug. 7.3	40.48 .55	69.3 2.8	61 11.4 6.2	25.8 2.7	49.94 -05	60.7 1.6	48.19 -02	48.7 0.0
17.3	39.87 .67	72.0 2.5	61 3.9 8.8	28.4 2.4	49.87 .09	62.2 1.4	48.14 .06	48.7 0.0
27.3	39.15 .76	74.3 2.1	60 53.8 11.2	30.6 2.0	49.77 .12	63.5 1.1	48.06 .10	48.7 -0.1
Sept. 6.2	38.35 -84	76.2 +1.7	60 41.5 -13.3	32.4 -1.6	49.63 -15	64.5 +0.9	47.94 -13	48.8 -0.1
16.2	37.47 -90	77.7 1.2	60 27.3 14.9	33.8 1.1	49.47 .17	65.2 0.6	47.79 .16	49.0 0.2
26.2	36.55 .93	78.6 0.7	60 11.9 15.8	34.6 -0.3	49.29 .18	65.6 +0.3	47.62 .17	49.2 0.2
Oct. 6.2	35.61 .94	79.1 +0.2	59 55.8 16.2	34.8 +0.1	49.11 .18	65.8 0.0	47.45 .18	49.3 0.1
16.1	34.66 .93	79.0 -0.4	59 39.6 16.0	34.4 0.7	48.92 .18	65.6 -0.3	47.27 .17	49.4 0.1
26.1	33.75 -89	78.3 -0.9	59 24.0 -15.1	33.4 +1.3	48.75 -16	65.2 -0.6	47.10 -13	49.5 -0.1
Nov. 5.1	32.88 .83	77.2 1.4	59 9.7 13.5	31.8 1.9	48.60 .14	64.4 0.9	46.96 .13	49.6 0.0
15.1	32.09 .74	75.5 1.9	58 57.1 11.4	29.7 2.4	48.48 .11	63.4 1.2	46.84 .10	49.6 0.0
25.1	31.40 .63	73.3 2.4	58 46.9 8.9	27.1 2.8	48.39 .07	62.1 1.4	46.76 .06	49.6 0.0
Dec. 5.1	30.84 .50	70.7 2.8	58 39.5 5.9	24.1 3.1	48.34 -03	60.6 1.6	46.72 -02	49.7 0.0
15.1	30.41 -35	67.7 -3.1	58 35.1 - 2.8	20.8 +3.4	48.33 +0.1	58.8 -1.8	46.73 +0.3	49.7 0.0
25.0	30.14 .19	64.5 3.3	58 34.0 + 0.5	17.4 3.5	48.37 .05	56.9 1.9	46.78 .07	49.7 0.0
35.0	30.03 -03	61.1 -3.5	58 36.1 + 4.3	13.8 +3.5	48.45 +0.9	55.0 -2.0	46.87 +1.1	49.7 0.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Draconis.		$\tau$ Draconis.		$\delta$ Aquilæ.		$\kappa$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 19 12	° ' " +67 28	h m 19 17	° ' " +73 9	h m 19 20	° ' " + 2 54	h m 19 31	° ' " - 7 14
Jan. 0.0	28.45 -07	65.5 -3.4	24.87 -15	69.2 -3.3	24.06 +08	48.1 -1.3	27.26 +08	67.5 -0.7
10.0	28.43 +04	62.1 3.4	24.79 -01	65.8 3.4	24.16 .11	46.8 1.3	27.35 .11	68.2 0.7
20.0	28.52 .14	58.7 3.4	24.86 +14	62.4 3.4	24.29 .15	45.5 1.2	27.47 .14	68.8 0.6
29.9	28.72 .25	55.4 3.2	25.07 .28	59.1 3.2	24.45 .18	44.3 1.1	27.63 .17	69.4 0.5
Feb. 8.9	29.01 .34	52.3 2.9	25.41 .41	56.0 2.9	24.64 .20	43.3 1.0	27.82 .20	69.9 0.4
18.9	29.40 +43	49.6 -2.5	25.88 +52	53.2 -2.5	24.86 +23	42.4 -0.7	28.04 +23	70.2 -0.2
28.9	29.86 .50	47.3 2.0	26.45 .62	50.9 2.1	25.10 .25	41.8 0.5	28.28 .25	70.4 0.0
Mar. 10.8	30.39 .55	45.6 1.4	27.12 .70	49.1 1.5	25.36 .27	41.5 -0.2	28.54 .27	70.3 +0.2
20.8	30.96 .59	44.5 0.8	27.85 .75	47.9 0.9	25.63 .28	41.5 +0.2	28.81 .28	70.0 0.4
30.8	31.57 .61	44.1 -0.1	28.62 .78	47.4 -0.2	25.92 .29	41.8 0.5	29.10 .29	69.5 0.6
Apr. 9.8	32.18 +61	44.3 +0.6	29.41 +78	47.5 +0.4	26.21 +29	42.4 +0.8	29.39 +30	68.7 +0.9
19.7	32.79 .59	45.2 1.2	30.18 .76	48.2 1.1	26.51 .29	43.4 1.1	29.69 .30	67.8 1.1
29.7	33.37 .56	46.7 1.8	30.93 .72	49.6 1.7	26.80 .29	44.7 1.3	29.99 .30	66.7 1.2
May 9.7	33.91 .51	48.7 2.3	31.62 .65	51.6 2.2	27.09 .28	46.1 1.5	30.29 .29	65.4 1.3
19.6	34.39 .45	51.2 2.7	32.23 .57	54.0 2.6	27.36 .27	47.8 1.7	30.58 .28	64.0 1.4
29.6	34.80 +37	54.1 +3.1	32.76 +47	56.9 +3.0	27.62 +25	49.5 +1.8	30.85 +26	62.6 +1.4
June 8.6	35.14 .29	57.4 3.3	33.17 .36	60.0 3.3	27.85 .22	51.4 1.8	31.09 .23	61.2 1.4
18.6	35.38 .19	60.8 3.5	33.47 .23	63.4 3.5	28.05 .19	53.2 1.8	31.31 .20	59.8 1.3
28.5	35.53 +10	64.4 3.6	33.64 +11	67.0 3.6	28.22 .15	55.0 1.8	31.50 .17	58.5 1.3
July 8.5	35.58 .00	68.0 3.6	33.68 -02	70.6 3.6	28.35 .11	56.7 1.7	31.64 .13	57.3 1.1
18.5	35.53 -10	71.5 +3.5	33.59 -15	74.1 +3.5	28.44 +07	58.3 +1.5	31.75 +08	56.2 +1.0
28.5	35.38 .19	74.9 3.3	33.38 .28	77.6 3.3	28.48 +02	59.8 1.4	31.81 +04	55.3 0.9
Aug. 7.4	35.14 .29	78.1 3.0	33.04 .40	80.8 3.1	28.48 -02	61.1 1.2	31.83 -01	54.5 0.7
17.4	34.81 .37	81.0 2.7	32.59 .50	83.8 2.8	28.44 .06	62.2 1.0	31.80 .05	53.9 0.5
27.4	34.40 .44	83.6 2.4	32.03 .60	86.4 2.5	28.36 .10	63.1 0.8	31.73 .09	53.4 0.4
Sept. 6.3	33.93 -50	85.8 +2.0	31.39 -68	88.7 +2.1	28.25 -13	63.8 +0.6	31.62 -12	53.1 +0.2
16.3	33.40 .55	87.6 1.5	30.68 .74	90.5 1.6	28.11 .15	64.3 0.4	31.49 .14	52.9 +0.1
26.3	32.83 .58	88.8 1.0	29.92 .78	91.9 1.1	27.95 .17	64.6 +0.2	31.34 .16	52.8 0.0
Oct. 6.3	32.24 .59	89.6 +0.5	29.12 .80	92.8 0.6	27.78 .17	64.7 0.0	31.17 .17	52.9 -0.1
16.2	31.65 .59	89.8 -0.1	28.31 .81	93.1 +0.1	27.60 .17	64.6 -0.2	31.00 .16	53.1 0.2
26.2	31.06 -57	89.5 -0.6	27.50 -79	92.9 -0.5	27.44 -15	64.3 -0.4	30.84 -15	53.3 -0.3
Nov. 5.2	30.50 .53	88.6 1.2	26.73 .74	92.2 1.0	27.30 .13	63.8 0.6	30.69 .13	53.6 0.4
15.2	29.99 .48	87.1 1.7	26.02 .68	90.9 1.6	27.18 .10	63.1 0.8	30.57 .11	54.0 0.4
25.1	29.54 .41	85.2 2.2	25.38 .59	89.0 2.1	27.09 .07	62.3 0.9	30.48 .07	54.5 0.5
Dec. 5.1	29.17 .33	82.8 2.6	24.83 .49	86.7 2.5	27.04 -03	61.3 1.1	30.43 -03	55.1 0.6
15.1	28.88 -24	80.0 -3.0	24.40 -37	84.0 -2.9	27.03 +01	60.1 -1.2	30.41 .00	55.7 -0.7
25.0	28.70 .14	76.9 3.2	24.10 .24	80.9 3.2	27.06 .05	58.9 1.3	30.44 +04	56.4 0.7
35.0	28.61 -03	73.5 -3.4	23.95 -10	77.6 -3.4	27.12 +09	57.5 -1.3	30.50 +08	57.1 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Aquilæ.		$\alpha$ Aquilæ. ( <i>Altair.</i> )		$\epsilon$ Draconis.		$\beta$ Aquilæ.	
	Right Ascension.	Declination <i>North.</i>	Right Ascension.	Declination <i>North.</i>	Right Ascension.	Declination <i>North.</i>	Right Ascension.	Declination <i>North.</i>
	$\begin{smallmatrix} h & m \\ 19 & 41 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ +10 & 21 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 19 & 45 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ +8 & 35 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 19 & 48 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ +70 & 0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ 19 & 50 \end{smallmatrix}$	$\begin{smallmatrix} ^\circ & ' \\ +6 & 9 \end{smallmatrix}$
Jan. 0.0	27.14 +.05	62.9 -1.7	51.02 +.05	66.8 -1.5	26.89 -1.19	46.3 -3.2	20.85 +.04	17.1 -1.4
10.0	27.21 .09	61.2 1.7	51.09 .08	65.2 1.5	26.76 -.07	43.0 3.3	20.91 .08	15.7 1.4
20.0	27.31 .12	59.6 1.6	51.19 .12	63.7 1.5	26.75 +.05	39.6 3.4	21.01 .12	14.3 1.4
30.0	27.45 .15	58.0 1.5	51.33 .15	62.2 1.4	26.86 .17	36.3 3.3	21.14 .15	12.9 1.3
Feb. 8.9	27.62 .18	56.6 1.3	51.50 .18	60.9 1.2	27.09 .28	33.1 3.1	21.31 .18	11.7 1.1
18.9	27.82 +.21	55.4 -1.1	51.69 +.21	59.8 -1.0	27.43 +.39	30.1 -2.8	21.50 +.20	10.8 -0.9
28.9	28.04 .23	54.5 0.7	51.91 .23	59.0 0.7	27.87 .48	27.6 2.3	21.71 .23	10.0 0.6
Mar. 10.9	28.29 .25	53.9 -0.4	52.16 .25	58.5 -0.3	28.39 .56	25.5 1.8	21.95 .25	9.6 -0.3
20.8	28.55 .27	53.7 0.0	52.42 .27	58.4 +0.1	28.98 .62	24.0 1.2	22.21 .27	9.5 +0.1
30.8	28.83 .28	53.9 +0.4	52.70 .28	58.6 0.4	29.62 .66	23.1 -0.6	22.48 .28	9.8 0.4
Apr. 9.8	29.12 +.29	54.5 +0.8	52.98 +.29	59.2 +0.8	30.30 +.68	22.8 +0.1	22.77 +.29	10.4 +0.8
19.7	29.41 .30	55.4 1.1	53.28 .30	60.2 1.1	30.98 .68	23.2 0.7	23.07 .30	11.3 1.1
29.7	29.71 .30	56.7 1.4	53.58 .30	61.5 1.4	31.65 .66	24.2 1.3	23.36 .30	12.6 1.4
May 9.7	30.00 .29	58.3 1.7	53.87 .29	63.0 1.7	32.29 .62	25.9 1.9	23.66 .29	14.1 1.6
19.7	30.29 .28	60.2 1.9	54.16 .28	64.9 1.9	32.88 .56	28.0 2.4	23.95 .28	15.9 1.8
29.6	30.55 +.26	62.2 +2.1	54.43 +.26	66.8 +2.0	33.40 +.48	30.6 +2.8	24.22 +.26	17.8 +1.9
June 8.6	30.80 .23	64.3 2.2	54.68 .23	68.9 2.1	33.84 .40	33.6 3.2	24.47 .24	19.8 2.0
18.6	31.01 .20	66.6 2.2	54.90 .20	71.1 2.1	34.20 .30	36.9 3.4	24.69 .21	21.8 2.0
28.6	31.19 .16	68.8 2.2	55.08 .17	73.2 2.1	34.45 .20	40.4 3.6	24.89 .17	23.7 2.0
July 8.5	31.34 .12	70.9 2.1	55.23 .13	75.3 2.0	34.59 +.09	44.1 3.6	25.04 .13	25.7 1.9
18.5	31.44 +.08	73.0 +2.0	55.34 +.09	77.3 +1.9	34.62 -.02	47.7 +3.6	25.15 +.09	27.6 +1.8
28.5	31.50 +.04	74.9 1.8	55.41 +.04	79.1 1.7	34.54 .13	51.3 3.5	25.22 +.05	29.3 1.6
Aug. 7.4	31.51 -.01	76.6 1.6	55.42 .00	80.8 1.6	34.36 .24	54.8 3.4	25.24 .00	30.8 1.4
17.4	31.48 .05	78.1 1.4	55.40 -.04	82.3 1.4	34.07 .34	58.0 3.1	25.22 -.04	32.1 1.2
27.4	31.41 .09	79.4 1.2	55.34 .08	83.5 1.1	33.69 .43	61.0 2.8	25.17 .08	33.3 1.0
Sept. 6.4	31.30 -.12	80.5 +0.9	55.24 -.12	84.5 +0.9	33.22 -.50	63.6 +2.4	25.07 -.11	34.2 +0.8
16.3	31.17 .15	81.3 0.7	55.11 .14	85.3 0.6	32.68 .57	65.9 2.0	24.94 .14	34.8 0.5
26.3	31.01 .16	81.8 0.4	54.95 .16	85.8 0.4	32.09 .62	67.7 1.5	24.79 .16	35.2 0.3
Oct. 6.3	30.84 .17	82.1 +0.1	54.78 .17	86.0 +0.1	31.45 .65	69.0 1.0	24.63 .17	35.4 +0.1
16.3	30.66 .17	82.1 -0.1	54.61 .17	86.0 -0.1	30.79 .66	69.8 +0.5	24.46 .17	35.4 -0.1
26.2	30.49 -.16	81.8 -0.4	54.45 -.16	85.8 -0.4	30.13 -.65	70.0 0.0	24.29 -.16	35.2 -0.3
Nov. 5.2	30.34 .14	81.3 0.6	54.29 .14	85.3 0.6	29.49 .63	69.7 -0.6	24.14 .14	34.7 0.6
15.2	30.20 .12	80.5 0.9	54.16 .12	84.6 0.8	28.87 .59	68.8 1.2	24.01 .12	34.0 0.8
25.2	30.09 .09	79.5 1.1	54.05 .09	83.7 1.0	28.31 .53	67.4 1.7	23.90 .09	33.2 1.0
Dec. 5.1	30.02 .06	78.3 1.3	53.98 .05	82.6 1.2	27.82 .45	65.4 2.2	23.83 .06	32.1 1.1
15.1	29.99 -.02	76.9 -1.5	53.94 -.02	81.2 -1.4	27.41 -.36	62.9 -2.6	23.79 -.02	30.9 -1.3
25.1	29.99 +.02	75.3 1.6	53.94 +.02	79.8 1.5	27.11 .25	60.1 3.0	23.79 +.02	29.6 1.4
35.0	30.03 +.06	73.7 -1.7	53.98 +.06	78.3 -1.5	26.91 -.14	57.0 -3.3	23.82 +.05	28.1 -1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♐ Aquilæ.		♞ Cephei.		♑ Capricorni.		♎ Pavonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 19 59	° ' " + 6 59	h m 20 12	° ' " + 77 24	h m 20 12	° ' " - 12 51	h m 20 17	° ' " - 57 3
	s	"	s	"	s	"	s	"
Jan. 0.1	12.16 +.03	36.0 -1.4	11.04 - .46	37.1 -2.9	26.96 +.04	28.9 -0.3	39.46 +.01	35.8 +2.3
10.0	12.21 -.07	34.5 1.4	10.68 -.27	34.1 3.1	27.01 -.07	29.1 0.2	39.51 -.08	33.5 2.4
20.0	12.30 -.11	33.1 1.4	10.50 -.08	30.9 3.3	27.10 -.11	29.3 0.2	39.62 -.15	31.1 2.5
30.0	12.43 -.14	31.8 1.3	10.51+ .11	27.4 3.3	27.23 -.14	29.5 -0.1	39.80 -.21	28.6 2.5
Feb. 9.0	12.58 -.17	30.6 1.1	10.72 -.30	24.3 3.2	27.38 -.17	29.5 0.0	40.04 -.27	26.1 2.5
18.9	12.76 +.20	29.6 -0.9	11.10+ .47	21.2 -2.9	27.57 +.20	29.4 +0.2	40.34 +.32	23.6 +2.4
28.9	12.97 .22	28.8 0.6	11.66 -.63	18.4 2.6	27.78 .22	29.1 0.4	40.68 -.37	21.3 2.3
Mar. 10.9	13.21 .24	28.4 -0.3	12.37 .76	16.1 2.1	28.01 .24	28.7 0.5	41.07 -.41	19.0 2.1
20.8	13.46 .26	28.3 +0.1	13.21 .87	14.2 1.6	28.27 .26	28.0 0.7	41.50 -.44	17.0 1.9
30.8	13.73 .28	28.5 0.4	14.14 -.95	13.0 1.0	28.54 .28	27.2 0.9	41.96 -.47	15.2 1.7
Apr. 9.8	14.02 +.29	29.1 +0.8	15.13+1.00	12.3 -0.3	28.83 +.30	26.3 +1.1	42.45 +.49	13.6 +1.4
19.8	14.31 .30	30.1 1.1	16.16 1.02	12.3 +0.3	29.14 .31	25.1 1.2	42.95 .51	12.3 1.1
29.7	14.61 .30	31.4 1.4	17.18 1.00	13.0 0.9	29.45 .31	23.8 1.3	43.47 .52	11.3 0.8
May 9.7	14.91 .29	32.9 1.7	18.17 .95	14.2 1.5	29.76 .31	22.5 1.4	43.98 .51	10.6 0.5
19.7	15.20 .28	34.7 1.9	19.10 .88	16.0 2.1	30.06 .30	21.1 1.4	44.49 .50	10.3 +0.2
June 29.7	15.47 +.27	36.6 +2.0	19.93+ .77	18.3 +2.5	30.36 +.29	19.7 +1.4	44.98 +.47	10.3 -0.2
8.6	15.73 .24	38.7 2.1	20.64 .64	21.1 2.9	30.64 .27	18.4 1.3	45.43 .44	10.7 0.5
18.6	15.96 .21	40.8 2.1	21.21 .50	24.1 3.2	30.89 .24	17.1 1.2	45.85 .39	11.4 0.9
28.6	16.16 .18	42.8 2.0	21.64 .34	27.5 3.4	31.12 .21	15.9 1.1	46.21 .33	12.4 1.2
July 8.5	16.32 .14	44.8 2.0	21.90 .18	31.0 3.6	31.30 .17	14.9 0.9	46.51 .27	13.7 1.4
18.5	16.44 +.10	46.8 +1.8	21.99+ .01	34.7 +3.6	31.45 +.12	14.1 +0.8	46.75 +.20	15.3 -1.7
28.5	16.52 .05	48.5 1.7	21.91- .16	38.3 3.6	31.55 .08	13.4 0.6	46.91 .12	17.1 1.8
Aug. 7.5	16.55 +.01	50.1 1.5	21.67 .32	41.9 3.5	31.61 +.03	12.9 0.4	46.99 +.04	19.0 1.9
17.4	16.54 -0.03	51.6 1.3	21.27 .48	45.3 3.3	31.62 -0.01	12.5 0.3	46.99 -0.04	20.9 1.9
27.4	16.48 .07	52.8 1.1	20.72 .62	48.5 3.1	31.58 .05	12.3 +0.1	46.91 .11	22.9 1.9
Sept. 6.4	16.39 -0.11	53.7 +0.9	20.03- .74	51.5 +2.8	31.51 -0.09	12.2 0.0	46.76 -0.18	24.7 -1.7
16.4	16.27 .13	54.4 0.6	19.23 .85	54.0 2.4	31.40 .12	12.3 -0.1	46.55 .24	26.4 1.5
26.3	16.13 .15	54.9 0.4	18.33 .94	56.2 2.0	31.27 .15	12.4 0.2	46.29 .28	27.8 1.2
Oct. 6.3	15.97 .17	55.2 +0.1	17.35 1.01	58.0 1.5	31.11 .16	12.6 0.2	45.99 .31	28.9 0.9
16.3	15.80 .17	55.2 -0.1	16.31 1.04	59.2 1.0	30.95 .16	12.9 0.3	45.66 .33	29.6 0.5
Nov. 26.2	15.63 -0.16	55.0 -0.3	15.25-1.06	59.9 +0.4	30.78 -0.16	13.2 -0.3	45.33 -0.32	29.9 -0.1
5.2	15.48 .15	54.6 0.6	14.20 1.03	60.0 -0.1	30.63 .14	13.5 0.3	45.02 .30	29.8 +0.3
15.2	15.34 .12	53.9 0.8	13.17 .99	59.6 0.7	30.49 .12	13.8 0.3	44.73 .27	29.3 0.7
25.2	15.23 .09	53.1 0.9	12.20 .92	58.6 1.3	30.38 .10	14.1 0.3	44.47 .22	28.3 1.1
Dec. 5.1	15.15 .06	52.1 1.1	11.32 .82	57.1 1.8	30.30 .06	14.5 0.3	44.28 .17	27.0 1.5
15.1	15.10 -0.03	50.9 -1.3	10.55- .69	55.1 -2.3	30.26 -0.03	14.8 -0.3	44.14 -0.10	25.3 +1.8
25.1	15.09 +.01	49.5 1.4	9.92 .54	52.6 2.7	30.25 +.01	15.1 0.3	44.07 -0.04	23.4 2.1
35.1	15.12 +.05	48.1 -1.5	9.45- .38	49.7 -3.1	30.28 +.04	15.4 -0.3	44.07 +.03	21.2 +2.3

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.								
Mean Solar Date	$\gamma$ Cygni.		$\pi$ Capricorni.		$\epsilon$ Delphini.		Groombridge 3241.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 20 18	° ' +39 55	h m 20 21	° ' -18 32	h m 20 28	° ' +10 57	h m 20 30	° ' +72 11
	s	"	s	"	s	"	s	"
Jan. 0.1	35.44 -04	67.2 -2.6	32.38 +03	35.5 +0.1	23.06 +01	39.8 -1.5	22.54 -34	34.6 -2.8
10.0	35.42 +01	64.5 2.7	32.43 .07	35.4 0.1	23.08 .04	38.3 1.5	22.27 .21	31.6 3.0
20.0	35.46 .06	61.7 2.8	32.52 .10	35.2 0.2	23.14 .07	36.7 1.5	22.12 -08	28.4 3.2
30.0	35.54 .10	58.9 2.7	32.64 .14	35.0 0.3	23.23 .11	35.2 1.4	22.10 +05	25.1 3.3
Feb. 9.0	35.67 .15	56.2 2.6	32.79 .17	34.6 0.4	23.36 .14	33.8 1.3	22.22 .19	21.8 3.2
18.9	35.84 +19	53.7 -2.3	32.97 +19	34.1 +0.5	23.51 +17	32.6 -1.1	22.47 +31	18.7 -3.0
28.9	36.05 .23	51.6 1.9	33.18 .22	33.5 0.7	23.70 .20	31.7 0.8	22.84 .43	15.8 2.7
Mar. 10.9	36.30 .27	49.9 1.5	33.41 .25	32.8 0.8	23.91 .22	31.1 0.4	23.32 .53	13.3 2.2
20.9	36.58 .30	48.6 1.0	33.67 .27	31.9 0.9	24.15 .25	30.8 -0.1	23.90 .62	11.4 1.7
30.8	36.89 .32	47.9 -0.4	33.95 .29	30.9 1.1	24.41 .27	30.9 +0.3	24.56 .69	9.9 1.1
Apr. 9.8	37.23 +34	47.8 +0.2	34.24 +30	29.8 +1.2	24.68 +28	31.4 +0.7	25.27 +73	9.1 -0.5
19.8	37.57 .35	48.3 0.7	34.55 .31	28.6 1.3	24.97 .30	32.3 1.1	26.02 .75	9.0 +0.2
29.7	37.93 .35	49.3 1.4	34.87 .32	27.3 1.3	25.27 .30	33.5 1.4	26.78 .75	9.4 0.8
May 9.7	38.28 .35	50.8 1.8	35.19 .32	25.9 1.3	25.58 .30	35.1 1.7	27.53 .73	10.5 1.4
19.7	38.62 .33	52.9 2.2	35.50 .31	24.6 1.3	25.88 .29	36.9 1.9	28.24 .68	12.2 1.9
29.7	38.94 +31	55.3 +2.6	35.81 +30	23.4 +1.2	26.17 +28	38.9 +2.1	28.90 +62	14.4 +2.4
June 8.6	39.24 .26	58.1 2.9	36.10 .28	22.2 1.1	26.44 .26	41.1 2.2	29.48 .54	17.1 2.8
18.6	39.50 .24	61.1 3.1	36.37 .25	21.1 1.0	26.69 .24	43.4 2.3	29.97 .44	20.1 3.2
28.6	39.72 .20	64.2 3.2	36.61 .22	20.2 0.8	26.91 .20	45.6 2.3	30.36 .33	23.4 3.4
July 8.6	39.90 .15	67.5 3.3	36.81 .18	19.5 0.7	27.10 .16	47.9 2.2	30.63 .22	26.9 3.6
18.5	40.02 +10	70.8 +3.3	36.97 +14	18.9 +0.5	27.24 +12	50.1 +2.1	30.79 +10	30.6 +3.7
28.5	40.09 +04	74.0 3.2	37.08 .09	18.5 0.3	27.34 .08	52.1 2.0	30.83 -02	34.3 3.7
Aug. 7.5	40.11 -01	77.1 3.0	37.15 +04	18.3 +0.1	27.40 +03	54.0 1.8	30.74 .14	38.0 3.6
17.4	40.07 .06	80.0 2.8	37.17 .00	18.3 0.0	27.41 -01	55.7 1.6	30.54 .26	41.5 3.4
27.4	39.98 .11	82.7 2.5	37.15 -05	18.4 -0.1	27.38 .05	57.2 1.4	30.22 .37	44.8 3.2
Sept. 6.4	39.85 -15	85.0 +2.2	37.08 -09	18.6 -0.2	27.31 -09	58.4 +1.1	29.81 -46	47.9 +2.9
16.4	39.68 .19	87.0 1.8	36.97 .12	18.9 0.3	27.20 .12	59.4 0.9	29.30 .55	50.7 2.5
26.3	39.48 .22	88.6 1.4	36.84 .14	19.2 0.4	27.07 .14	60.1 0.6	28.71 .62	53.1 2.1
Oct. 6.3	39.25 .23	89.8 1.0	36.68 .16	19.6 0.4	26.92 .16	60.6 0.3	28.06 .67	55.0 1.7
16.3	39.02 .24	90.5 +0.5	36.52 .17	20.0 0.4	26.76 .16	60.8 +0.1	27.37 .70	56.4 1.2
26.2	38.77 -24	90.8 0.0	36.35 -16	20.4 -0.3	26.59 -16	60.7 -0.2	26.65 -72	57.3 +0.6
Nov. 5.2	38.53 .23	90.6 -0.5	36.19 .15	20.7 0.3	26.43 .15	60.4 0.4	25.93 .71	57.7 +0.1
15.2	38.31 .21	89.9 0.9	36.05 .13	20.9 0.2	26.29 .14	59.8 0.7	25.22 .69	57.5 -0.5
25.2	38.11 .18	88.7 1.4	35.93 .10	21.1 0.2	26.16 .11	59.0 0.9	24.55 .64	56.7 1.1
Dec. 5.1	37.94 .15	87.1 1.8	35.84 .07	21.3 -0.1	26.06 .08	58.0 1.1	23.93 .58	55.3 1.6
15.1	37.81 -11	85.1 -2.2	35.79 -03	21.4 0.0	25.99 -05	56.7 -1.3	23.39 -50	53.4 -2.2
25.1	37.72 .07	82.8 2.5	35.77 .00	21.4 0.0	25.96 -02	55.3 1.5	22.94 .40	51.0 2.6
35.1	37.68 -02	80.2 -2.7	35.79 +04	21.3 0.0	25.96 +02	53.8 -1.5	22.59 -29	48.2 -3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Cygni.		$\mu$ Aquarii.		12 Year Cat. 1879.		$\nu$ Cygni	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 20 37	<sup>°</sup> <sup>'</sup> +44 54	<sup>h</sup> <sup>m</sup> 20 47	<sup>°</sup> <sup>'</sup> - 9 21	<sup>h</sup> <sup>m</sup> 20 52	<sup>°</sup> <sup>'</sup> +80 10	<sup>h</sup> <sup>m</sup> 20 53	<sup>°</sup> <sup>'</sup> +40 46
	<sup>s</sup>	"	<sup>s</sup>	"	<sup>s</sup>	"	<sup>s</sup>	"
Jan. 0.1	58.35 -.07	79.1 -2.6	12.38 .00	44.2 -0.4	2.81- .80	39.8 -2.6	23.70 -.08	51.9 -2.4
10.1	58.30 -.02	76.4 2.8	12.40 +.04	44.6 0.4	2.13 .57	37.1 2.9	23.64 -.03	49.4 2.6
20.0	58.30 +.03	73.5 2.9	12.45 .07	44.9 0.3	1.67 .34	34.1 3.1	23.64 +.02	46.7 2.7
30.0	58.35 .08	70.6 2.9	12.54 .10	45.2 0.2	1.44- .10	30.9 3.2	23.67 .06	44.0 2.7
Feb. 9.0	58.46 .13	67.8 2.8	12.66 .13	45.3 -0.1	1.46+ .14	27.6 3.2	23.76 .11	41.3 2.6
19.0	58.61 +.18	65.1 -2.5	12.80 +.16	45.3 +0.1	1.72+ .38	24.4 -3.1	23.89 +.15	38.7 -2.4
28.9	58.81 .22	62.7 2.2	12.98 .20	45.1 0.3	2.22 .61	21.4 2.8	24.06 .20	36.4 2.1
Mar. 10.9	59.05 .26	60.7 1.7	13.18 .22	44.7 0.5	2.94 .81	18.8 2.5	24.28 .24	34.5 1.7
20.9	59.33 .30	59.2 1.2	13.41 .24	44.1 0.7	3.85 .99	16.5 2.0	24.53 .27	33.1 1.2
30.8	59.65 .33	58.3 0.7	13.66 .26	43.3 0.9	4.92 1.13	14.8 1.5	24.82 .30	32.1 0.7
Apr. 9.8	59.99 +.35	57.9 -0.1	13.93 +.28	42.3 +1.1	6.10+1.22	13.6 -0.9	25.14 +.33	31.7 -0.1
19.8	60.36 .37	58.1 +0.5	14.22 .30	41.0 1.3	7.36 1.28	13.0 -0.2	25.48 .35	31.8 +0.4
29.8	60.73 .38	58.9 1.1	14.53 .31	39.6 1.4	8.66 1.29	13.1 +0.4	25.84 .36	32.5 1.0
May 9.7	61.11 .37	60.3 1.6	14.84 .31	38.1 1.5	9.95 1.27	13.8 1.0	26.20 .36	33.8 1.5
19.7	61.48 .36	62.1 2.1	15.15 .31	36.5 1.6	11.20 1.20	15.1 1.6	26.56 .35	35.6 2.0
29.7	61.83 +.34	64.4 +2.5	15.45 +.30	34.9 +1.6	12.35+1.10	16.9 +2.1	26.91 +.34	37.8 +2.4
June 8.6	62.16 .31	67.1 2.8	15.74 .28	33.3 1.6	13.39 .96	19.2 2.5	27.24 .31	40.3 2.7
18.6	62.45 .27	70.1 3.1	16.01 .26	31.8 1.5	14.27 .80	22.0 2.9	27.53 .28	43.2 3.0
28.6	62.70 .22	73.3 3.3	16.26 .23	30.3 1.4	14.99 .62	25.1 3.2	27.79 .24	46.3 3.2
July 8.6	62.90 .17	76.7 3.4	16.47 .19	29.0 1.2	15.51 .42	28.4 3.5	28.01 .19	49.5 3.3
18.5	63.05 +.12	80.1 +3.4	16.65 +.15	27.8 +1.1	15.83+ .22	32.0 +3.6	28.17 +.14	52.8 +3.3
28.5	63.15 .06	83.5 3.4	16.78 .11	26.8 0.9	15.94+ .01	35.6 3.7	28.29 .09	56.1 3.2
Aug. 7.5	63.18 +.01	86.8 3.2	16.87 .06	26.0 0.7	15.84- .20	39.3 3.7	28.35 +.03	59.3 3.1
17.5	63.16 -.05	89.9 3.0	16.91 +.02	25.4 0.5	15.54 .40	42.9 3.6	28.36 -.02	62.4 3.0
27.4	63.08 .10	92.8 2.8	16.90 -.02	25.0 0.3	15.04 .59	46.5 3.4	28.31 .07	65.3 2.7
Sept. 6.4	62.95 -.15	95.5 +2.5	16.86 -.06	24.8 +0.2	14.35- .77	49.8 +3.2	28.21 -.12	67.9 +2.4
16.4	62.78 .19	97.8 2.1	16.78 .10	24.7 0.0	13.50 .92	52.8 2.9	28.08 .16	70.1 2.1
26.3	62.57 .22	99.7 1.7	16.66 .12	24.8 -0.1	12.49 1.06	55.5 2.5	27.90 .19	72.1 1.7
Oct. 6.3	62.34 .24	101.2 1.3	16.53 .14	24.9 0.2	11.36 1.17	57.8 2.1	27.70 .21	73.6 1.3
16.3	62.08 .26	102.2 0.8	16.38 .15	25.2 0.3	10.14 1.26	59.7 1.6	27.48 .23	74.7 0.9
26.3	61.82 -.26	102.7 +0.3	16.22 -.15	25.5 -0.4	8.85-1.30	61.0 +1.1	27.24 -.23	75.3 +0.4
Nov. 5.2	61.56 .25	102.8 -0.2	16.07 .15	25.9 0.4	7.52 1.32	61.8 +0.5	27.01 .23	75.5 -0.1
15.2	61.31 .24	102.3 0.7	15.93 .13	26.3 0.4	6.18 1.30	62.1 0.0	26.78 .22	75.2 0.6
25.2	61.08 .22	101.4 1.2	15.80 .11	26.8 0.5	4.88 1.25	61.7 -0.6	26.57 .20	74.4 1.0
Dec. 5.2	60.88 .19	100.0 1.7	15.71 .08	27.3 0.5	3.66 1.16	60.8 1.2	26.39 .17	73.1 1.5
15.1	60.71 -.15	98.1 -2.1	15.64 -.05	27.7 -0.5	2.54-1.04	59.3 -1.8	26.23 -.14	71.5 -1.9
25.1	60.58 .10	95.8 2.4	15.60 -.02	28.2 0.5	1.56 .88	57.3 2.3	26.11 .10	69.4 2.2
35.1	60.50 -.06	93.3 -2.7	15.60 +.01	28.6 -0.4	0.76- .70	54.8 -2.7	26.03 -.06	67.0 -2.5



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61 Cygni.		ζ Cygni.		α Cephei.		ι Pegasi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 21 2	° ' " +38 15	h m 21 8	° ' " +29 48	h m 21 16	° ' " +62 9	h m 21 17	° ' " +19 22
	s	"	s	"	s	"	s	"
Jan. 0.1	21.49 -06	19.7 -2.2	37.82 -06	54.2 -2.0	8.35 -24	42.6 -2.4	24.73 -05	27.6 -1.6
10.1	21.45 -02	17.4 2.4	37.78 -02	52.1 2.2	8.14 -17	40.0 2.7	24.70 -01	25.9 1.7
20.0	21.45 +02	14.9 2.5	37.78 +02	49.8 2.3	8.01 -10	37.0 3.0	24.70 +02	24.1 1.8
30.0	21.49 -06	12.4 2.5	37.81 -05	47.5 2.3	7.95 -02	33.9 3.1	24.74 -05	22.3 1.8
Feb. 9.0	21.57 -11	9.9 2.4	37.88 -09	45.3 2.2	7.97 +06	30.8 3.1	24.81 -09	20.6 1.7
19.0	21.70 +15	7.5 -2.2	37.99 +13	43.2 -2.0	8.08 +15	27.6 -3.0	24.91 +12	19.0 -1.5
28.9	21.87 -19	5.4 2.0	38.14 -17	41.3 1.7	8.26 -23	24.7 2.8	25.05 -16	17.7 1.2
Mar. 10.9	22.08 -23	3.6 1.6	38.33 -20	39.8 1.3	8.53 -30	22.1 2.4	25.22 -19	16.6 0.9
20.9	22.33 -27	2.3 1.1	38.55 -24	38.6 0.9	8.86 -37	19.9 2.0	25.43 -22	15.9 0.5
30.9	22.62 -30	1.4 -0.6	38.80 -27	37.9 -0.4	9.26 -43	18.2 1.4	25.66 -25	15.6 -0.1
Apr. 9.8	22.93 +33	1.1 0.0	39.08 +29	37.7 +0.1	9.72 +47	17.0 -0.8	25.92 +27	15.7 +0.3
19.8	23.27 -35	1.3 +0.5	39.39 -31	38.0 0.5	10.21 -51	16.5 -0.2	26.20 -29	16.2 0.8
29.8	23.63 -36	2.1 1.0	39.71 -32	38.8 1.0	10.73 -53	16.5 +0.4	26.50 -31	17.2 1.2
May 9.7	23.99 -36	3.4 1.5	40.04 -33	40.1 1.5	11.27 -53	17.2 1.0	26.81 -31	18.6 1.5
19.7	24.35 -36	5.2 2.0	40.37 -33	41.8 1.9	11.80 -52	18.5 1.6	27.13 -31	20.3 1.8
29.7	24.71 +34	7.4 +2.4	40.69 +32	43.9 +2.2	12.31 +50	20.4 +2.1	27.44 +31	22.3 +2.1
June 8.7	25.04 -32	10.0 2.7	41.00 -30	46.3 2.5	12.79 -46	22.7 2.5	27.75 -29	24.6 2.4
18.6	25.35 -29	12.9 3.0	41.29 -27	49.0 2.7	13.22 -41	25.5 2.9	28.03 -27	27.0 2.5
28.6	25.62 -25	16.0 3.2	41.55 -24	51.8 2.9	13.60 -35	28.6 3.2	28.29 -24	29.6 2.6
July 8.6	25.86 -21	19.2 3.3	41.78 -20	54.8 3.0	13.91 -28	31.9 3.5	28.51 -21	32.2 2.6
18.6	26.04 +16	22.6 +3.3	41.96 +16	57.7 +3.0	14.15 +20	35.5 +3.6	28.70 +17	34.8 +2.6
28.5	26.18 -11	25.9 3.3	42.09 -11	60.7 2.9	14.31 -12	39.2 3.7	28.85 -12	37.3 2.5
Aug. 7.5	26.26 +06	29.1 3.2	42.18 -06	63.5 2.8	14.39 +04	42.9 3.7	28.95 -08	39.7 2.3
17.5	26.29 -00	32.2 3.0	42.22 +01	66.2 2.6	14.39 -04	46.5 3.6	29.00 +03	42.0 2.1
27.4	26.27 -05	35.1 2.8	42.21 -03	68.7 2.4	14.31 -12	50.0 3.4	29.01 -01	44.0 1.9
Sept. 6.4	26.20 -09	37.8 +2.5	42.15 -07	71.0 +2.1	14.15 -19	53.3 +3.2	28.98 -05	45.8 +1.7
16.4	26.09 -13	40.1 2.2	42.06 -11	72.9 1.8	13.92 -25	56.4 2.9	28.91 -09	47.3 1.4
26.4	25.95 -16	42.1 1.8	41.93 -14	74.6 1.5	13.64 -31	59.1 2.5	28.81 -12	48.6 1.1
Oct. 6.3	25.77 -19	43.7 1.4	41.77 -17	75.8 1.1	13.31 -35	61.4 2.1	28.68 -14	49.5 0.8
16.3	25.57 -20	44.9 1.0	41.60 -18	76.8 0.7	12.93 -39	63.2 1.6	28.53 -15	50.2 0.5
26.3	25.37 -21	45.7 +0.5	41.41 -19	77.3 +0.3	12.53 -41	64.6 +1.1	28.37 -16	50.5 +0.2
Nov. 5.3	25.16 -21	46.0 +0.1	41.22 -19	77.4 -0.1	12.11 -42	65.5 +0.6	28.21 -16	50.5 -0.2
15.2	24.95 -20	45.8 -0.4	41.04 -18	77.1 0.5	11.69 -41	65.8 0.0	28.05 -15	50.2 0.3
25.2	24.76 -18	45.2 0.8	40.87 -16	76.4 0.9	11.28 -40	65.5 -0.6	27.90 -14	49.5 0.8
Dec. 5.2	24.59 -16	44.1 1.3	40.72 -14	75.4 1.3	10.90 -37	64.6 1.2	27.77 -12	48.6 1.1
15.1	24.45 -13	42.6 -1.7	40.60 -11	73.9 -1.6	10.54 -33	63.2 -1.7	27.67 -09	47.4 -1.3
25.1	24.34 -09	40.8 2.0	40.50 -08	72.2 1.9	10.24 -28	61.2 2.2	27.59 -07	45.9 1.5
35.1	24.27 -06	38.6 -2.3	40.44 -05	70.2 -2.1	9.99 -22	58.8 -2.6	27.54 -04	44.3 -1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Aquarii.		$\beta$ Cephei.		$\xi$ Aquarii.		$\epsilon$ Pegasi.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 21 26	° ' " — 6 0	h m 21 27	° ' " +70 6	h m 21 32	° ' " — 8 18	h m 21 39	° ' " + 9 24
Jan. 0.1	14.64 −.03	54.3 −0.6	18.63 −.40	79.3 −2.3	22.69 −.03	24.7 −0.5	13.59 −.05	48.7 −1.2
10.1	14.63 .00	54.9 0.5	18.28 .30	76.8 2.7	22.68 .00	25.1 0.4	13.56 −.02	47.5 1.2
20.1	14.64 +.03	55.4 0.4	18.02 .20	73.9 3.0	22.69 +.03	25.4 0.3	13.56 +.01	46.2 1.2
30.0	14.69 .06	55.7 0.3	17.87 −.09	70.8 3.2	22.73 .05	25.6 −0.2	13.58 .04	45.0 1.2
Feb. 9.0	14.76 .09	56.0 −0.2	17.84 +.02	67.6 3.2	22.80 .09	25.7 0.0	13.63 .07	43.8 1.1
19.0	14.87 +.12	56.1 0.0	17.92 +.14	64.4 −3.1	22.90 +.12	25.7 +0.1	13.72 +.10	42.8 −0.9
28.9	15.01 .15	56.0 +0.2	18.11 .23	61.4 2.9	23.03 .15	25.5 0.3	13.84 .13	42.0 0.7
Mar. 10.9	15.17 .18	55.7 0.4	18.42 .36	58.5 2.6	23.19 .18	25.0 0.6	13.99 .16	41.5 0.4
20.9	15.37 .21	55.2 0.7	18.84 .46	56.1 2.2	23.38 .20	24.3 0.8	14.17 .19	41.2 −0.1
30.9	15.59 .23	54.4 0.9	19.34 .54	54.1 1.7	23.60 .23	23.5 1.0	14.38 .22	41.3 +0.2
Apr. 9.8	15.84 +.26	53.4 +1.1	19.92 +.61	52.7 −1.1	23.85 +.26	22.4 +1.2	14.62 +.25	41.7 +0.6
19.8	16.11 .28	52.1 1.3	20.56 .66	51.9 −0.5	24.11 .28	21.1 1.4	14.88 .27	42.5 1.0
29.8	16.40 .30	50.7 1.5	21.24 .69	51.6 +0.1	24.40 .30	19.6 1.6	15.17 .29	43.6 1.3
May 9.8	16.70 .31	49.1 1.7	21.94 .70	52.0 0.7	24.70 .31	17.9 1.7	15.47 .30	45.1 1.6
19.7	17.01 .31	47.4 1.8	22.64 .68	53.0 1.3	25.02 .31	16.2 1.8	15.78 .31	46.8 1.8
29.7	17.32 +.31	45.5 +1.8	23.31 +.65	54.6 +1.8	25.33 +.31	14.4 +1.8	16.09 +.31	48.7 +2.0
June 8.7	17.63 .30	43.7 1.8	23.94 .60	56.7 2.3	25.64 .30	12.6 1.8	16.39 .30	50.8 2.1
18.6	17.92 .28	41.9 1.8	24.52 .54	59.3 2.8	25.93 .28	10.9 1.7	16.68 .28	53.0 2.2
28.6	18.18 .25	40.2 1.7	25.01 .46	62.3 3.1	26.20 .26	9.2 1.6	16.95 .26	55.3 2.3
July 8.6	18.42 .22	38.6 1.5	25.43 .37	65.6 3.4	26.45 .23	7.7 1.4	17.20 .23	57.5 2.2
18.6	18.62 +.18	37.2 +1.4	25.74 +.26	69.1 +3.6	26.66 +.19	6.3 +1.3	17.40 +.19	59.7 +2.1
28.5	18.79 .14	35.9 1.2	25.96 .16	72.8 3.7	26.83 .15	5.2 1.1	17.57 .15	61.8 2.0
Aug. 7.5	18.91 .10	34.8 1.0	26.06 +.05	76.5 3.7	26.96 .11	4.2 0.8	17.70 .10	63.7 1.9
17.5	18.99 .05	34.0 0.7	26.06 −0.06	80.3 3.7	27.04 .06	3.5 0.6	17.78 .06	65.5 1.7
27.5	19.02 +.01	33.3 0.5	25.95 .16	83.9 3.6	27.08 +.02	3.0 0.4	17.82 +.02	67.0 1.4
Sept. 6.5	19.01 −.03	32.9 +0.3	25.74 −.23	87.4 +3.4	27.08 −.02	2.7 +0.2	17.81 −.02	68.4 +1.2
16.4	18.96 .07	32.6 +0.1	25.44 .34	90.7 3.1	27.03 .06	2.5 0.0	17.77 .06	69.5 1.0
26.4	18.88 .10	32.6 0.0	25.05 .42	93.6 2.8	26.95 .09	2.6 −0.1	17.69 .09	70.3 0.7
Oct. 6.3	18.77 .12	32.6 −0.1	24.60 .49	96.2 2.4	26.85 .12	2.7 0.2	17.59 .12	70.9 0.5
16.3	18.63 .14	32.8 0.3	24.08 .54	98.4 1.9	26.72 .13	3.0 0.3	17.46 .13	71.2 +0.2
26.3	18.49 −.14	33.2 −0.4	23.52 −.58	100.1 +1.4	26.58 −.14	3.4 −0.4	17.32 −.14	71.4 0.0
Nov. 5.3	18.35 .14	33.6 0.4	22.92 .60	101.2 0.9	26.43 .14	3.9 0.5	17.18 .14	71.3 −0.2
15.2	18.21 .13	34.0 0.5	22.32 .60	101.8 +0.3	26.29 .13	4.4 0.5	17.04 .14	70.9 0.4
25.2	18.08 .12	34.6 0.5	21.72 .59	101.8 −0.3	26.17 .12	4.9 0.5	16.91 .13	70.4 0.6
Dec. 5.2	17.97 .10	35.1 0.6	21.15 .56	101.2 0.9	26.05 .10	5.4 0.5	16.79 .11	69.6 0.8
15.2	17.88 −.08	35.7 −0.6	20.61 −.51	100.0 −1.5	25.96 −.08	6.0 −0.5	16.69 −.09	68.7 −1.0
25.1	17.82 .05	36.3 0.6	20.13 .44	98.3 2.0	25.90 .05	6.5 0.5	16.61 .07	67.6 1.1
35.1	17.78 −.02	36.9 −0.6	19.73 −.37	95.1 −2.5	25.86 −.02	7.0 −0.5	16.55 −.04	66.4 −1.2

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	11 Cephei.		$\mu$ Capricorni.		79 Draconis.		$\alpha$ Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 21 40	° ' " +70 50	h m 21 47	° ' " -14 1	h m 21 51	° ' " +73 13	h m 22 0	° ' " - 0 48
	s	"	s	"	s	"	s	"
Jan. 0.1	24.00 -44	65.4 -2.1	47.61 -04	38.2 -0.2	33.13 -53	47.8 -2.0	36.00 -06	34.3 -0.8
10.1	23.60 -35	63.1 2.5	47.58 -02	38.3 -0.1	32.65 -44	45.6 2.4	35.96 -03	35.1 0.7
20.1	23.30 -24	60.4 2.8	47.57 +01	38.3 +0.1	32.26 -32	43.0 2.8	35.94 -00	35.8 0.7
30.0	23.11 -13	57.4 3.1	47.60 -04	38.2 0.2	32.00 -20	40.0 3.1	35.95 +02	36.4 0.6
Feb. 9.0	23.04 -02	54.2 3.2	47.66 -07	37.9 0.3	31.86 -07	36.9 3.2	35.99 -05	36.9 0.4
19.0	23.08 +10	51.0 -3.2	47.75 +10	37.5 +0.5	31.86 +07	33.7 -3.2	36.06 +08	37.3 -0.3
Mar. 1.0	23.25 -23	47.9 3.0	47.87 -13	36.9 0.7	32.01 -21	30.6 3.1	36.16 -11	37.5 -0.1
10.9	23.53 -34	45.0 2.7	48.01 -16	36.1 0.9	32.29 -35	27.6 2.8	36.29 -15	37.4 +0.2
20.9	23.93 -45	42.4 2.3	48.19 -19	35.1 1.1	32.70 -47	24.9 2.4	36.45 -18	37.1 0.4
30.9	24.42 -54	40.3 1.8	48.40 -22	33.9 1.3	33.23 -58	22.7 2.0	36.65 -21	36.5 0.7
Apr. 9.9	25.00 +61	38.7 -1.3	48.64 +25	32.5 +1.5	33.86 +67	21.0 -1.5	36.87 +24	35.7 +1.0
19.8	25.65 -67	37.7 0.7	48.91 -28	31.0 1.6	34.57 -74	19.8 0.9	37.12 -26	34.6 1.2
29.8	26.35 -71	37.3 -0.1	49.20 -30	29.3 1.7	35.34 -79	19.2 -0.3	37.40 -28	33.2 1.5
May 9.8	27.07 -72	37.5 +0.5	49.50 -31	27.6 1.8	36.15 -81	19.2 +0.3	37.69 -30	31.6 1.7
19.7	27.79 -72	38.4 1.1	49.82 -32	25.8 1.8	36.96 -81	19.9 0.9	38.00 -31	29.9 1.8
29.7	28.50 +69	39.8 +1.7	50.14 +32	24.0 +1.8	37.76 +78	21.1 +1.5	38.31 +31	28.0 +1.9
June 8.7	29.17 -64	41.8 2.2	50.45 -31	22.3 1.7	38.52 -73	22.9 2.0	38.62 -30	26.0 2.0
18.7	29.78 -58	44.2 2.6	50.76 -30	20.7 1.6	39.23 -67	25.2 2.5	38.92 -29	24.0 2.0
28.6	30.33 -50	47.1 3.0	51.05 -28	19.2 1.4	39.86 -58	27.9 2.9	39.20 -27	22.0 1.9
July 8.6	30.78 -41	50.3 3.3	51.31 -25	17.8 1.2	40.39 -48	31.0 3.2	39.46 -24	20.2 1.8
18.6	31.14 +31	53.7 +3.5	51.54 +21	16.7 +1.0	40.82 +37	34.4 +3.5	39.69 +21	18.4 +1.7
28.6	31.40 -20	57.4 3.7	51.73 -17	15.8 0.8	41.14 -25	38.0 3.7	39.89 -17	16.8 1.5
Aug. 7.5	31.55 +09	61.1 3.8	51.87 -12	15.2 0.5	41.33 -13	41.7 3.8	40.03 -13	15.4 1.3
17.5	31.59 -02	64.9 3.7	51.97 -08	14.8 0.3	41.40 +01	45.5 3.8	40.13 -09	14.2 1.1
27.5	31.51 -13	68.6 3.6	52.03 +03	14.6 +0.1	41.35 -11	49.2 3.7	40.20 +04	13.2 0.9
Sept. 6.4	31.34 -23	72.2 +3.5	52.04 -01	14.6 -0.1	41.18 -23	52.9 +3.6	40.22 -00	12.4 +0.7
16.4	31.06 -32	75.6 3.2	52.01 -05	14.8 0.3	40.90 -33	56.4 3.3	40.20 -04	11.8 0.5
26.4	30.70 -40	78.6 2.9	51.94 -08	15.1 0.4	40.51 -43	59.6 3.0	40.14 -07	11.5 0.3
Oct. 6.4	30.25 -48	81.4 2.5	51.84 -11	15.6 0.5	40.03 -52	62.5 2.7	40.06 -10	11.3 +0.1
16.3	29.74 -54	83.7 2.1	51.72 -13	16.1 0.6	39.47 -59	65.0 2.3	39.95 -12	11.4 -0.1
26.3	29.18 -58	85.6 +1.6	51.59 -14	16.6 -0.6	38.85 -65	67.0 +1.8	39.82 -13	11.6 -0.3
Nov. 5.3	28.59 -61	86.9 1.1	51.45 -14	17.2 0.5	38.18 -68	68.6 1.3	39.69 -13	11.9 0.4
15.3	27.97 -61	87.7 +0.5	51.31 -14	17.8 0.5	37.48 -70	69.6 0.7	39.56 -13	12.3 0.5
25.2	27.35 -61	87.9 -0.1	51.17 -13	18.3 0.5	36.77 -70	70.0 +0.1	39.43 -12	12.8 0.6
Dec. 5.2	26.75 -58	87.5 0.7	51.05 -11	18.8 0.4	36.07 -68	69.8 -0.5	39.31 -11	13.5 0.7
15.2	26.18 -54	86.5 -1.3	50.95 -09	19.2 -0.3	35.40 -64	69.0 -1.1	39.21 -09	14.2 -0.7
25.1	25.67 -48	85.0 1.8	50.87 -06	19.5 0.2	34.79 -58	67.6 1.6	39.13 -07	14.9 0.8
35.1	25.22 -41	82.9 -2.3	50.82 -04	19.7 -0.2	34.25 -52	65.7 -2.2	39.07 -05	15.7 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Gruis.		$\theta$ Aquarii.		$\pi$ Aquarii.		$\eta$ Aquarii.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 22 I	° —47 26	h m 22 II	° — 8 16	h m 22 20	° + 0 51	h m 22 30	° — 0 37
	s	"	s	"	s	"	s	"
Jan. 0.1	52.24 -11	67.4 +1.3	30.56 -06	68.7 -0.5	7.46 -07	58.0 -0.8	10.34 -07	72.9 -0.8
10.1	52.15 -07	66.0 1.6	30.51 -04	69.1 0.4	7.40 -04	57.2 0.8	10.28 -05	73.6 0.7
20.1	52.10 -03	64.2 1.9	30.49 -01	69.4 0.2	7.37 -02	56.5 0.7	10.24 -03	74.2 0.6
30.1	52.10 +02	62.0 2.1	30.49 +02	69.6 -0.1	7.36 -00	55.8 0.6	10.22 -00	74.8 0.5
Feb. 9.0	52.14 -06	59.9 2.3	30.52 -05	69.6 0.0	7.38 +03	55.2 -05	10.23 +02	75.3 0.4
19.0	52.22 +11	57.5 +2.5	30.58 +08	69.5 +0.2	7.43 +06	54.7 -09	10.27 +05	75.7 -0.2
Mar. 1.0	52.35 -15	55.0 2.6	30.67 -11	69.2 0.4	7.50 -09	54.5 -01	10.35 -08	75.8 0.0
11.0	52.53 -20	52.4 2.6	30.79 -14	68.7 0.6	7.62 -13	54.5 +0.1	10.44 -12	75.8 +0.2
20.9	52.75 -24	49.7 2.6	30.95 -17	68.0 0.8	7.76 -16	54.7 0.4	10.57 -15	75.4 0.4
30.9	53.02 -28	47.1 2.6	31.14 -20	67.0 1.1	7.93 -19	55.2 0.6	10.74 -18	74.9 0.7
Apr. 9.9	53.32 +32	44.6 +2.5	31.35 +23	65.9 +1.3	8.14 +22	55.9 +0.9	10.94 +22	74.0 +1.0
19.8	53.65 -35	42.2 2.3	31.60 -26	64.5 1.5	8.38 -25	57.0 1.2	11.17 -25	72.9 1.2
29.8	54.03 -38	39.9 2.1	31.87 -28	62.9 1.7	8.65 -27	58.3 1.4	11.43 -27	71.5 1.5
May 9.8	54.42 -40	37.9 1.9	32.16 -30	61.2 1.8	8.93 -29	59.9 1.6	11.71 -29	70.0 1.7
19.8	54.83 -42	36.2 1.6	32.47 -31	59.3 1.9	9.24 -31	61.6 1.8	12.01 -30	68.2 1.8
29.7	55.26 +42	34.7 +1.3	32.78 +31	57.4 +1.9	9.55 +31	63.5 +1.9	12.32 +31	66.3 +1.9
June 8.7	55.68 -42	33.7 0.9	33.10 -31	55.5 1.9	9.86 -31	65.5 2.0	12.64 -31	64.3 2.0
18.7	56.09 -40	32.9 0.5	33.41 -30	53.7 1.8	10.16 -30	67.6 2.0	12.95 -30	62.3 2.0
28.7	56.48 -37	32.6 +0.1	33.70 -28	51.9 1.7	10.46 -28	69.6 2.0	13.24 -28	60.3 2.0
July 8.6	56.83 -33	32.7 -0.3	33.97 -25	50.3 1.6	10.73 -25	71.6 1.9	13.52 -26	58.3 1.9
18.6	57.15 +29	33.1 -0.6	34.21 +22	48.8 +1.4	10.97 +22	73.4 +1.8	13.76 +23	56.5 +1.7
28.6	57.41 -24	34.0 1.0	34.41 -18	47.6 1.1	11.17 -19	75.2 1.6	13.98 -20	54.8 1.6
Aug. 7.5	57.62 -18	35.1 1.3	34.57 -14	46.5 0.9	11.34 -15	76.7 1.4	14.15 -16	53.4 1.4
17.5	57.77 -11	36.5 1.5	34.69 -10	45.7 0.7	11.46 -10	78.0 1.2	14.29 -11	52.1 1.2
27.5	57.85 +05	38.2 2.7	34.77 -06	45.1 0.5	11.55 -04	79.2 1.0	14.38 -07	51.1 0.9
Sept. 6.5	57.87 -02	40.0 -1.8	34.80 +01	44.8 +0.2	11.58 +02	80.1 +0.8	14.43 +03	50.3 +0.7
16.4	57.82 -07	41.9 1.9	34.80 -03	44.7 0.0	11.58 -02	80.7 0.6	14.44 -01	49.7 0.5
26.4	57.72 -12	43.8 1.8	34.75 -06	44.7 -0.2	11.55 -05	81.2 0.3	14.41 -04	49.3 0.5
Oct. 6.4	57.58 -17	45.6 1.7	34.67 -09	45.0 0.4	11.48 -08	81.4 +0.1	14.35 -07	49.2 +0.1
16.4	57.39 -20	47.2 1.5	34.57 -11	45.3 0.5	11.38 -10	81.4 0.0	14.26 -10	49.2 -0.1
26.3	57.18 -22	48.5 -1.2	34.45 -12	45.8 -0.5	11.27 -12	81.3 -0.2	14.16 -11	49.4 -0.3
Nov. 5.3	56.95 -23	49.6 0.9	34.32 -13	46.3 0.6	11.15 -13	81.0 0.3	14.04 -12	49.7 0.4
15.3	56.71 -23	50.3 0.5	34.19 -13	46.9 0.6	11.02 -13	80.6 0.5	13.92 -12	50.2 0.5
25.2	56.48 -22	50.7 -0.1	34.06 -12	47.5 0.6	10.89 -12	80.1 0.6	13.80 -12	50.7 0.6
Dec. 5.2	56.27 -20	50.6 +0.3	33.94 -11	48.0 0.6	10.77 -11	79.5 0.7	13.68 -11	51.3 0.7
15.2	56.08 -17	50.2 +0.7	33.84 -10	48.6 -0.5	10.66 -10	78.8 -0.7	13.57 -10	52.0 -0.7
25.2	55.92 -14	49.3 1.0	33.75 -08	49.1 0.5	10.57 -08	78.0 0.8	13.47 -08	52.7 0.7
35.1	55.80 -10	48.1 +1.4	33.68 -06	49.6 -0.4	10.50 -07	77.2 -0.5	13.39 -07	53.5 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	226 Cephei (B.)		ζ Pegasi.		ι Cephei.		λ Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 22 30	° ' " +75 42	h m 22 36	° ' " +10 18	h m 22 46	° ' " +65 40	h m 22 47	° ' " - 8 6
Jan. 0.2	27.46 -71	43.7 -1.5	25.82 -08	22.5 -1.0	3.98 -39	30.7 -1.4	21.23 -08	59.0 -0.5
10.1	26.80 -62	41.9 2.0	25.75 -06	21.5 1.1	3.61 -34	29.1 1.9	21.15 -06	59.4 0.2
20.1	26.23 -51	39.7 2.4	25.70 -04	20.4 1.1	3.29 -28	26.9 2.3	21.10 -04	59.7 0.2
30.1	25.79 -38	37.1 2.8	25.67 -02	19.2 1.1	3.04 -21	24.4 2.7	21.07 -02	59.9 -0.1
Feb. 9.1	25.48 -23	34.2 3.0	25.66 +01	18.2 1.0	2.86 -13	21.6 2.9	21.07 +01	60.0 0.0
19.0	25.33 -07	31.0 -3.1	25.69 +04	17.2 -0.9	2.77 -05	18.6 -3.0	21.09 +04	59.9 +0.2
Mar. 1.0	25.34 +09	27.9 3.1	25.75 -08	16.4 0.7	2.77 +05	15.6 3.0	21.14 -07	59.5 0.4
11.0	25.31 -26	24.8 3.0	25.84 -11	15.8 0.5	2.87 -15	12.6 2.9	21.23 -10	59.0 0.6
20.9	25.85 -41	21.9 2.7	25.97 -15	15.5 -0.2	3.06 -24	9.8 2.6	21.35 -14	58.2 0.9
30.9	26.34 -56	19.3 2.4	26.14 -18	15.4 +0.1	3.35 -33	7.3 2.3	21.50 -17	57.2 1.1
Apr. 9.9	26.96 +68	17.2 -1.9	26.34 +22	15.7 +0.5	3.72 +41	5.3 -1.8	21.69 +20	56.0 +1.3
19.9	27.71 -79	15.5 1.4	26.57 -25	16.4 0.8	4.17 -48	3.7 1.3	21.91 -23	54.6 1.5
29.8	28.54 -87	14.4 0.8	26.83 -27	17.4 1.1	4.68 -54	2.6 0.8	22.16 -26	53.0 1.7
May 9.8	29.44 -92	13.9 -0.2	27.11 -29	18.6 1.4	5.24 -58	2.1 -0.2	22.43 -29	51.2 1.8
19.8	30.38 -94	13.9 +0.4	27.41 -31	20.2 1.7	5.84 -60	2.3 +0.4	22.73 -30	49.3 1.9
29.8	31.33 +94	14.6 +1.0	27.73 +31	22.0 +1.9	6.45 +61	3.0 +1.0	23.04 +31	47.3 +2.0
June 8.7	32.26 -91	15.9 1.5	28.04 -31	24.0 2.1	7.05 -60	4.2 1.5	23.36 -32	45.3 2.0
18.7	33.14 -85	17.6 2.0	28.35 -30	26.2 2.2	7.64 -57	6.0 2.0	23.67 -31	43.4 1.9
28.7	33.96 -77	19.9 2.5	28.65 -29	28.4 2.2	8.19 -53	8.3 2.5	23.97 -29	41.5 1.8
July 8.6	34.68 -67	22.7 2.9	28.93 -26	30.7 2.2	8.70 -47	11.0 2.9	24.26 -27	39.8 1.7
18.6	35.30 +56	25.8 +3.2	29.18 +23	32.9 +2.2	9.14 +41	14.0 +3.2	24.53 +25	38.2 +1.5
28.6	35.80 -43	29.1 3.5	29.40 -20	35.0 2.1	9.52 -34	17.4 3.4	24.76 -21	36.8 1.2
Aug. 7.6	36.17 -30	32.7 3.7	29.58 -16	37.0 1.9	9.82 -26	20.9 3.6	24.95 -17	35.7 1.0
17.5	36.40 -17	36.5 3.8	29.72 -12	38.9 1.8	10.03 -17	24.5 3.7	25.10 -13	34.8 0.8
27.5	36.50 +03	40.3 3.8	29.81 -07	40.6 1.6	10.16 +09	28.2 3.7	25.21 -09	34.2 0.5
Sept. 6.5	36.46 -11	44.1 +3.7	29.86 +03	42.0 +1.3	10.20 -00	31.9 +3.6	25.28 +05	33.8 +0.2
16.5	36.28 -24	47.8 3.6	29.88 -01	43.3 1.1	10.16 -08	35.5 3.5	25.31 +01	33.7 0.0
26.4	35.98 -36	51.3 3.4	29.85 -04	44.3 0.9	10.04 -16	38.9 3.3	25.30 -03	33.8 -0.2
Oct. 6.4	35.56 -48	54.6 3.1	29.80 -07	45.0 0.6	9.85 -23	42.1 3.0	25.25 -06	34.0 0.3
16.4	35.03 -58	57.5 2.8	29.72 -09	45.5 0.4	9.59 -29	44.9 2.7	25.18 -09	34.4 0.5
26.3	34.41 -66	60.1 +2.3	29.61 -11	45.8 +0.2	9.27 -34	47.4 +2.3	25.08 -11	34.9 -0.6
Nov. 5.3	33.71 -73	62.2 1.8	29.49 -12	45.8 -0.1	8.91 -38	49.4 1.8	24.96 -12	35.5 0.6
15.3	32.95 -78	63.8 1.3	29.37 -12	45.6 0.3	8.51 -41	50.9 1.3	24.84 -12	36.1 0.6
25.3	32.15 -81	64.8 0.7	29.24 -12	45.2 0.5	8.09 -43	51.9 0.7	24.72 -12	36.8 0.7
Dec. 5.2	31.33 -81	65.2 +0.1	29.12 -12	44.7 0.7	7.65 -44	52.3 +0.1	24.60 -12	37.4 0.6
15.2	30.52 -79	65.0 -0.5	29.00 -11	43.9 -0.8	7.21 -43	52.1 -0.5	24.49 -12	38.0 -0.6
25.2	29.75 -75	64.2 1.1	28.90 -09	43.0 1.0	6.79 -41	51.4 1.1	24.39 -11	38.6 0.5
35.2	29.03 -68	62.8 -1.7	28.82 -08	42.0 -1.1	6.39 -38	50.0 -1.6	24.30 -09	39.1 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Piscis Australis. (Fomalhaut.)		$\alpha$ Pegasi. (Markab.)		$\alpha$ Cephei.		$\theta$ Piscium.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 22 52	° ' —30 8	h m 22 59	° ' +14 39	h m 23 14	° ' +67 33	h m 23 22	° ' + 5 49
	s	"	s	"	s	"	s	"
Jan. 0.2	4.68 —.10	91.4 +0.3	44.20 —.10	52.0 —1.0	28.12 —.45	56.0 —1.0	51.27 —.10	33.7 —0.8
10.2	4.59 —.08	90.9 0.6	44.11 —.08	50.9 1.1	27.69 —.41	54.7 1.5	51.18 —.09	32.8 0.8
20.1	4.52 —.06	90.2 0.8	44.04 —.06	49.7 1.2	27.30 —.36	52.9 2.0	51.10 —.07	32.0 0.8
30.1	4.47 —.03	89.3 1.1	43.99 —.04	48.4 1.2	26.97 —.29	50.7 2.4	51.04 —.05	31.2 0.8
Feb. 9.1	4.46 —.00	88.1 1.3	43.97 —.01	47.2 1.2	26.72 —.21	48.1 2.7	51.00 —.03	30.4 0.7
19.0	4.47 +.03	86.6 +1.5	43.97 +.02	46.0 —1.1	26.53 —.12	45.2 —2.9	50.98 —.00	29.8 —0.6
Mar. 1.0	4.52 —.07	85.0 1.8	44.00 —.05	45.0 0.9	26.48 —.02	42.2 3.0	51.00 +.03	29.3 0.4
11.0	4.61 —.11	83.1 1.9	44.07 —.09	44.1 0.7	26.51 +.09	39.2 3.0	51.04 —.06	29.0 —0.2
20.9	4.73 —.14	81.1 2.1	44.18 —.12	43.6 0.4	26.65 —.19	36.3 2.8	51.12 —.10	28.9 +0.1
30.9	4.89 —.18	78.9 2.2	44.32 —.16	43.3 —0.1	26.89 —.29	33.6 2.5	51.24 —.14	29.1 0.3
Apr. 9.9	5.10 +.22	76.7 +2.3	44.50 +.20	43.3 +0.2	27.23 +.39	31.3 —2.1	51.40 +.18	29.6 +0.6
19.9	5.33 —.25	74.4 2.3	44.72 —.23	43.7 0.6	27.66 —.47	29.4 1.6	51.59 —.21	30.3 0.9
29.8	5.60 —.28	72.1 2.3	44.97 —.26	44.4 0.9	28.17 —.54	28.0 1.1	51.82 —.24	31.4 1.2
May 9.8	5.90 —.31	69.8 2.2	45.25 —.29	45.5 1.2	28.75 —.60	27.2 —0.6	52.08 —.27	32.7 1.5
19.8	6.22 —.33	67.6 2.1	45.54 —.31	46.9 1.5	29.37 —.63	26.9 0.0	52.36 —.29	34.3 1.7
29.8	6.56 +.34	65.6 +1.9	45.86 +.32	48.6 +1.8	30.01 +.65	27.2 +0.6	52.66 +.31	36.1 +1.9
June 8.7	6.91 —.35	63.7 1.7	46.18 —.32	50.5 2.0	30.67 —.65	28.1 1.1	52.97 —.31	38.0 2.0
18.7	7.26 —.34	62.1 1.5	46.50 —.31	52.6 2.2	31.32 —.64	29.5 1.7	53.29 —.31	40.1 2.1
28.7	7.60 —.33	60.8 1.2	46.81 —.30	54.8 2.3	31.94 —.60	31.4 2.2	53.60 —.30	42.2 2.1
July 8.7	7.92 —.31	59.8 0.8	47.10 —.28	57.1 2.3	32.52 —.55	33.8 2.6	53.90 —.29	44.3 2.1
18.6	8.22 +.28	59.1 +0.5	47.37 +.25	59.5 +2.3	33.05 +.49	36.6 +2.9	54.18 +.26	46.4 +2.0
28.6	8.48 —.24	58.8 +0.2	47.60 —.22	61.8 2.2	33.51 —.42	39.7 3.2	54.43 —.23	48.3 1.9
Aug. 7.6	8.70 —.20	58.8 —0.2	47.81 —.18	64.0 2.1	33.89 —.34	43.0 3.5	54.62 —.20	50.1 1.7
17.6	8.87 —.15	59.1 0.5	47.96 —.14	66.0 2.0	34.19 —.26	46.6 3.6	54.82 —.16	51.8 1.5
27.5	9.00 —.10	59.8 0.8	48.08 —.10	68.0 1.8	34.40 —.17	50.3 3.7	54.97 —.12	53.2 1.3
Sept. 6.5	9.08 +.05	60.7 —1.0	48.16 +.06	69.7 +1.6	34.53 +.08	54.0 +3.7	55.07 +.08	54.4 +1.1
16.5	9.11 +.01	61.9 1.2	48.20 +.02	71.2 1.4	34.56 —.01	57.6 3.6	55.13 —.04	55.4 0.9
26.4	9.10 —.04	63.1 1.3	48.19 —.02	72.4 1.1	34.51 —.09	61.2 3.5	55.15 +.01	56.2 0.6
Oct. 6.4	9.04 —.07	64.5 1.4	48.16 —.05	73.4 0.9	34.38 —.17	64.6 3.2	55.14 —.03	56.7 0.4
16.4	8.95 —.10	65.9 1.4	48.10 —.08	74.2 0.6	34.17 —.24	67.7 2.9	55.10 —.05	57.0 +0.2
26.4	8.83 —.13	67.2 —1.3	48.01 —.10	74.7 +0.4	33.89 —.31	70.4 +2.6	55.03 —.08	57.1 0.0
Nov. 5.3	8.69 —.14	68.5 1.2	47.90 —.11	75.0 +0.1	33.55 —.36	72.8 2.1	54.94 —.09	57.0 —0.2
15.3	8.54 —.15	69.6 1.0	47.78 —.12	75.0 —0.1	33.16 —.41	74.7 1.6	54.84 —.10	56.8 0.3
25.3	8.39 —.15	70.4 0.8	47.66 —.12	74.7 0.4	32.73 —.44	76.1 1.1	54.73 —.11	56.4 0.5
Dec. 5.3	8.24 —.15	71.1 0.5	47.54 —.12	74.3 0.6	32.28 —.46	76.9 +0.5	54.62 —.11	55.8 0.6
15.2	8.09 —.14	71.4 —0.2	47.42 —.12	73.6 —0.8	31.81 —.47	77.2 —0.1	54.51 —.11	55.2 —0.9
25.2	7.96 —.12	71.5 +0.1	47.30 —.12	72.7 1.0	31.34 —.46	76.8 0.7	54.40 —.11	54.4 0.8
35.2	7.85 —.09	71.3 +0.4	47.20 —.09	71.7 —1.1	30.89 —.44	75.9 —1.2	54.30 —.10	53.6 —0.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Piscium.		γ Cephei.		Groombridge 4163.		♋ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 23 34	° ' " + 5 4	h m 23 35	° ' " +77 4	h m 23 49	° ' " +73 50	h m 23 54	° ' " + 6 18
Jan. 0.2	46.00	-10	46.08	-85	54.81	-67	8.28	-10
10.2	45.91	.09	9.84	.79	54.15	.63	8.18	.10
20.2	45.82	.08	9.07	.72	53.53	.58	8.08	.09
30.1	45.75	.06	8.39	.62	52.97	.51	8.00	.07
Feb. 9.1	45.70	.04	7.82	.49	52.50	.41	7.94	.05
19.1	45.68	-.01	7.41	-.34	52.14	-.30	7.89	-.03
Mar. 1.1	45.68	+.02	7.15	-.17	51.91	.16	7.88	.00
11.0	45.72	.05	7.07	+.02	51.81	-.02	7.89	+.03
21.0	45.79	.09	7.18	.20	51.86	+.12	7.94	.07
30.9	45.90	.13	7.47	.38	52.06	.27	8.03	.11
Apr. 9.9	46.04	+.16	7.94	+.55	52.40	+.41	8.16	+.14
19.9	46.23	.20	8.56	.70	52.88	.54	8.33	.18
29.9	46.45	.23	9.33	.82	53.48	.65	8.53	.22
May 9.9	46.70	.26	10.21	.92	54.17	.74	8.77	.25
19.9	46.97	.29	11.18	1.00	54.95	.81	9.04	.28
29.8	47.27	+.31	12.20	1.04	55.79	+.85	9.33	+.30
June 8.8	47.59	.32	13.26	1.05	56.65	.87	9.64	.31
18.7	47.90	.32	14.31	1.04	57.53	.87	9.95	.32
28.7	48.22	.31	15.33	.99	58.39	.84	10.27	.31
July 8.7	48.52	.29	16.29	.92	59.21	.79	10.58	.30
18.7	48.80	+.27	17.17	+.84	59.97	+.73	10.87	+.28
28.6	49.06	.24	17.96	.73	60.66	.65	11.14	.25
Aug. 7.6	49.29	.21	18.63	.61	61.26	.55	11.38	.22
17.6	49.48	.17	19.17	.47	61.77	.45	11.59	.19
27.6	49.63	.13	19.58	.33	62.16	.34	11.76	.15
Sept. 6.5	49.75	+.09	19.84	+.19	62.44	+.22	11.89	+.11
16.5	49.82	.06	19.96	.04	62.61	+.11	11.98	.07
26.5	49.86	+.02	19.93	-.10	62.66	-.01	12.04	+.04
Oct. 6.4	49.86	-.01	19.76	.24	62.59	.12	12.06	.00
16.4	49.83	.04	19.46	.37	62.41	.23	12.05	-.03
26.4	49.77	-.06	19.02	-.49	62.13	-.33	12.01	-.05
Nov. 5.4	49.70	.08	18.47	.60	61.75	.43	11.93	.07
15.3	49.61	.10	17.82	.70	61.28	.51	11.87	.09
25.3	49.50	.11	17.07	.77	60.74	.57	11.77	.10
Dec. 5.3	49.39	.11	16.26	.82	60.13	.63	11.67	.11
15.3	49.28	-.11	15.41	-.85	59.48	-.66	11.56	-.11
25.2	49.17	.11	14.54	.86	58.81	.67	11.45	.11
35.2	49.07	-.10	13.68	-.84	58.14	-.67	11.34	-.11

## APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Cassiop.	22 Androm.	$\sigma$ Androm.	$\iota$ Ceti.	6 Urs. Min. S. P.	44 Piscium.	$\pi$ Androm.	$\circ$ Cassiop.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	31 24 0 3	44 29 0 5	53 46 0 13	99 23 0 14	358 16 0 13	88 37 0 20	56 50 0 31	42 16 0 39
(Dec. 30.3)	47.81 -31	4.98 -21	3.90 -16	17.63 -10	88.33+7.44	14.44 -13	30.12 -18	6.77 -23
Jan. 9.2	47.50 -30	4.78 -19	3.75 -15	17.53 -10	95.73 7.31	14.32 -11	29.94 -16	6.55 -23
19.2	47.21 -27	4.59 -18	3.60 -15	17.43 -09	102.89 6.99	14.23 -09	29.80 -15	6.32 -22
29.2	46.95 -23	4.42 -17	3.46 -14	17.34 -08	109.56+6.39	14.14 -08	29.65 -14	6.12 -20
Aug. 26.6	52.54 +25	8.96 +21	7.52 +19	20.89 +17	45.22-3.35	17.66 +17	33.53 +22	10.51 +25
Sept. 5.5	52.76 -18	9.14 -16	7.74 -15	21.04 -13	42.30 2.43	17.80 -14	33.73 -18	10.75 -21
15.5	52.91 -12	9.26 -11	7.87 -11	21.16 -10	40.36 1.41	17.93 -10	33.88 -13	10.94 -16
25.5	53.00 +06	9.35 -06	7.95 -07	21.24 -06	39.49- .34	18.01 -07	33.98 -09	11.07 -11
Oct. 5.5	53.02 -00	9.38 +01	8.00 +03	21.28 +02	39.69+ .76	18.06 -04	34.06 -05	11.16 -06
15.4	52.99 -05	9.37 -03	8.01 -01	21.28 -01	41.02+1.86	18.08 +01	34.09 +01	11.20 +02
25.4	52.91 -11	9.32 -07	7.98 -04	21.26 -03	43.42 2.95	18.07 -02	34.08 -02	11.20 -02
Nov. 4.4	52.77 -16	9.24 -11	7.92 -07	21.22 -06	46.92 4.00	18.03 -05	34.05 -05	11.15 -06
14.4	52.59 -21	9.11 -14	7.84 -10	21.15 -08	51.42 4.95	17.97 -07	33.98 -07	11.07 -10
24.3	52.37 -24	8.97 -16	7.72 -12	21.05 -10	56.84 5.80	17.89 -09	33.90 -09	10.95 -13
Dec. 4.3	52.11 -27	8.80 -18	7.59 -14	20.95 -10	63.04+6.51	17.80 -10	33.79 -11	10.80 -16
14.3	51.82 -29	8.62 -19	7.45 -15	20.85 -11	69.86 7.03	17.70 -10	33.66 -13	10.63 -18
24.2	51.52 -30	8.42 -20	7.29 -16	20.73 -11	77.11 7.33	17.59 -11	33.52 -15	10.43 -20
34.2	51.22 -30	8.22 -20	7.13 -16	20.62 -11	84.52+7.48	17.48 -11	33.36 -15	10.23 -20
Mean Solar Date.	$\delta$ Piscium.	$\gamma$ Cassiop.	$\mu$ Androm.	43 Cephei.	$\kappa$ Tucanæ.	$f$ Piscium.	$\kappa$ Octantis, S. P.	$\nu$ Androm.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	82 58 0 43	29 50 0 50	52 3 0 51	4 17 0 54	159 25 1 12	86 55 1 12	184 44 1 24	49 6 1 30
(Dec. 30.3)	27.57 -11	37.84 -32	9.88 -15	57.20-2.68	22.36 -55	36.56 -11	33.96+2.89	53.68 -14
Jan. 9.2	27.46 -12	37.52 -33	9.72 -16	54.49 2.71	21.80 -56	36.44 -12	36.91 2.94	53.52 -17
19.2	27.34 -11	37.19 -32	9.55 -17	51.78 2.68	21.24 -54	36.32 -11	39.85 2.89	53.33 -20
29.2	27.24 -10	36.88 -31	9.38 -17	49.14-2.60	20.71 -52	36.21 -10	42.69+2.69	53.12 -21
Sept. 5.6	30.79 +16	42.43 +27	13.48 +20	75.90+1.58	25.91 +36	39.48 +21	32.52-1.49	56.98 +26
15.5	30.93 -12	42.68 -22	13.66 -16	77.32 1.21	26.23 -28	39.66 -16	31.23 1.06	57.22 -22
25.5	31.04 -09	42.88 -16	13.80 -12	78.32 .80	26.48 -18	39.79 -12	30.40 .61	57.42 -18
Oct. 5.5	31.11 -06	43.00 -10	13.90 -08	78.92+ .39	26.60 +08	39.90 -09	30.02- .15	57.57 -13
15.5	31.16 +03	43.07 +04	13.96 +04	79.09- .05	26.63 -03	39.97 -06	30.11+ .34	57.69 -09
25.4	31.17 -00	43.08 -03	13.98 -00	78.81- .49	26.54 -14	40.01 +03	30.73+ .84	57.76 +05
Nov. 4.4	31.15 -03	43.02 -09	13.96 -03	78.11 -92	26.34 -24	40.02 -00	31.82 1.33	57.80 +01
14.4	31.12 -05	42.91 -15	13.91 -06	76.96 1.34	26.06 -34	40.00 -03	33.41 1.78	57.80 -02
24.4	31.06 -07	42.73 -20	13.84 -09	75.43 1.72	25.67 -42	39.96 -05	35.39 2.18	57.76 -05
Dec. 4.3	30.98 -09	42.52 -23	13.73 -12	73.53 2.06	25.22 -48	39.90 -07	37.77 2.52	57.69 -08
14.3	30.89 -11	42.27 -27	13.60 -14	71.30-2.36	24.72 -52	39.82 -09	40.42+2.74	57.59 -12
24.3	30.77 -11	41.98 -30	13.45 -15	68.81 2.58	24.18 -54	39.72 -10	43.25 2.88	57.45 -15
34.2	30.66 -10	41.67 -33	13.29 -16	66.17-2.70	23.63 -55	39.62 -11	46.19+2.95	57.29 -17



APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.								
Mean Solar Date.	$\pi$ Piscium.	$\nu$ Piscium.	$\zeta$ Ceti.	$\gamma$ Androm.	$\beta$ Trianguli.	$\delta$ Urs. Min., S. P.	$\gamma$ Trianguli.	$\delta$ Ceti.
	$^{\circ}$ / 78 22	$^{\circ}$ / 85 1	$^{\circ}$ / 100 50	$^{\circ}$ / 48 9	$^{\circ}$ / 55 29	$^{\circ}$ / 348 1	$^{\circ}$ / 56 37	$^{\circ}$ / 96 53
	h m 1 31	h m 1 36	h m 1 46	h m 1 57	h m 2 3	h m 2 9	h m 2 11	h m 2 11
(Dec. 30.3)	46.04 -11	11.89 -10	29.96 -11	43.67 -15	33.75 -12	11.68+ .99	20.34 -12	58.27 -09
Jan. 9.3	45.92 -12	11.78 -11	29.84 -12	43.51 -17	33.62 -14	12.72 1.06	20.21 -14	58.17 -11
19.2	45.80 -12	11.66 -12	29.72 -13	43.33 -19	33.46 -16	13.80 1.10	20.06 -16	58.05 -13
29.2	45.68 -12	11.53 -12	29.58 -14	43.14 -20	33.30 -17	14.92 1.10	19.89 -17	57.91 -14
Feb. 8.2	45.56 -12	11.41 -11	29.44 -13	42.93 -19	33.12 -17	16.01 1.06	19.73 -17	57.77 -13
18.2	45.43 -13	11.31 -09	29.31 -12	42.76 -17	32.96 -16	17.04+ .99	19.55 -18	57.64 -11
Sept. 25.6	49.22 +13	14.97 +13	32.82 +16	47.26 +21	37.11 +20	8.49- .60	23.60 +21	60.97 +18
Oct. 5.5	49.35 -11	15.09 -11	32.96 -12	47.45 -18	37.29 -17	7.97 .45	23.79 -18	61.13 -14
15.5	49.44 -08	15.19 -08	33.06 -10	47.61 -14	37.45 -14	7.60 .29	23.96 -14	61.25 -11
25.5	49.50 +05	15.25 +05	33.14 +06	47.72 +09	37.56 +10	7.40- .12	24.08 +10	61.35 +08
Nov. 4.5	49.53 +02	15.29 +02	33.18 +02	47.79 .05	37.64 .06	7.37+ .07	24.16 .06	61.42 .05
14.4	49.54 -01	15.30 -01	33.19 -01	47.83 +01	37.68 +02	7.53 .26	24.22 +03	61.45 +02
24.4	49.51 .04	15.28 .04	33.16 .04	47.83 -02	37.68 -01	7.89 .44	24.23 -01	61.45 -01
Dec. 4.4	49.47 .06	15.23 .06	33.12 .06	47.79 .06	37.65 .04	8.41 .60	24.21 .04	61.43 .04
14.3	49.40 -08	15.17 -08	33.06 -08	47.71 -10	37.59 -07	9.10+ .76	24.16 -07	61.38 -07
24.3	49.31 .10	15.07 .10	32.97 .10	47.59 .13	37.51 .11	9.94 .91	24.08 .10	61.29 .09
34.3	49.21 -11	14.97 -10	32.85 -12	47.44 -16	37.38 -14	10.92+1.05	23.96 -13	61.20 -11
Mean Solar Date.	$\delta$ Hydri.	$\mu$ Hydri.	$\delta$ Ceti.	$\theta$ Persei.	$\sigma$ Arietis.	$\delta$ Cephei.	$\epsilon$ Arietis.	$\beta$ Persei. (Algol.)
	$^{\circ}$ / 159 7	$^{\circ}$ / 169 33	$^{\circ}$ / 90 6	$^{\circ}$ / 41 12	$^{\circ}$ / 75 20	$^{\circ}$ / 10 59	$^{\circ}$ / 69 4	$^{\circ}$ / 49 26
	h m 2 19	h m 2 33	h m 2 34	h m 2 37	h m 2 45	h m 2 52	h m 2 53	h m 3 1
(Dec. 30.3)	59.30 -54	51.16 -115	20.07 -08	20.31 -14	56.80 -08	45.01- .70	28.12 -08	38.03 -09
Jan. 9.3	58.75 -57	49.97 1.22	19.97 -10	20.15 .18	56.71 .11	44.25 .82	28.03 .10	37.93 -14
19.3	58.17 -59	48.72 1.26	19.86 -12	19.95 .21	56.59 .13	43.38 .92	27.92 -12	37.77 -17
29.2	57.57 -59	47.44 1.26	19.72 -14	19.72 .22	56.46 -14	42.42 .99	27.78 -14	37.59 -19
Feb. 8.2	56.99 -58	46.19 1.24	19.58 -14	19.49 .23	56.31 -15	41.40 1.02	27.64 -15	37.39 -20
18.2	56.42 -56	44.95 -118	19.44 -12	19.25 -24	56.17 -14	40.37 -1.02	27.48 -16	37.19 -19
Sept. 25.6	61.20 +34	51.78+ .70	22.64 +19	23.83 +29	59.47 +21	52.02+ .94	30.83 +22	41.07 +28
Oct. 5.6	61.49 .25	52.38 .50	22.82 .16	24.10 .25	59.67 .18	52.90 .82	31.03 .20	41.33 .25
15.5	61.69 .15	52.76 .29	22.97 .13	24.34 .21	59.84 .15	53.65 .67	31.22 .18	41.57 .22
25.5	61.79 +05	52.94+ .07	23.09 +10	24.52 +17	59.98 +12	54.24+ .50	31.39 +15	41.77 +18
Nov. 4.5	61.78 -06	52.89- .16	23.18 .08	24.66 .12	60.09 .09	54.65 .33	31.51 .11	41.93 .14
14.5	61.66 .18	52.60 .39	23.25 .05	24.76 .08	60.18 .06	54.89+ .16	31.60 .07	42.04 .10
24.4	61.44 .28	52.11 .59	23.27 +02	24.81 +03	60.23 +03	54.96- .03	31.66 .04	42.13 .06
Dec. 4.4	61.11 .36	51.42 .77	23.27 -01	24.81 -02	60.24 .00	54.83 .23	31.69 +01	42.16 +02
14.4	60.70 -44	50.56- .94	23.24 -04	24.76 -07	60.23 -03	54.49- .43	31.68 -02	42.15 -02
24.4	60.23 .50	49.54 1.07	23.19 .07	24.65 .12	60.19 .06	53.97 .59	31.64 .05	42.11 .07
34.3	59.71 -53	48.41 -116	23.11 -10	24.51 -16	60.11 -09	53.30- .73	31.57 -08	42.01 -12

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Hydri.	ρ Octantis, S. P.	γ Tauri.	γ Camelop.	γ Hydri.	ε Persei.	α <sup>1</sup> Tauri.	ε Persei.
	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	167 45 3 18	185 52 3 19	77 25 3 25	18 59 3 39	164 33 3 48	50 17 3 51	68 12 3 58	42 33 4 1
(Dec. 30.4)	32.13- .89	53.79+2.20	19.80- .06	46.42- .26	51.51- .59	7.09- .07	45.75- .03	22.66- .06
Jan. 9.3	31.20 .99	56.07 2.35	19.73 .09	46.10 .36	50.85 .70	7.01 .10	45.70 .07	22.58 .11
19.3	30.17 1.06	58.48 2.47	19.63 .11	45.69 .44	50.10 .79	6.90 .13	45.61 .10	22.45 .15
29.3	29.08 1.10	60.99 2.54	19.51 .13	45.22 .50	49.26 .85	6.74 .17	45.50 .13	22.28 .19
Feb. 8.3	27.97 1.11	63.55 2.56	19.37 .15	44.68 .55	48.39 .89	6.56 .20	45.35 .15	22.06 .22
18.3	26.86- 1.10	66.09+2.50	19.21- .16	44.11- .57	47.48- .91	6.35- .22	45.19- .17	21.83- .24
28.2	25.78- 1.06	68.52+2.35	19.05- .15	43.53- .57	46.57- .89	6.13- .21	45.01- .18	21.57- .26
Oct. 5.6	31.35+ .62	62.71- 1.04	22.35 +.22	51.14 +.60	50.15 +.56	9.97 +.31	48.21 +.26	25.66 +.35
15.6	31.89 .45	61.83 .71	22.56 .19	51.73 .54	50.68 .46	10.26 .27	48.46 .23	25.99 .32
25.5	32.24+ .26	61.29- .32	22.73 +.16	52.25 +.47	51.07 +.33	10.51 +.23	48.68 +.20	26.29 +.28
Nov. 4.5	32.39+ .07	61.18+ .10	22.88 .14	52.67 .37	51.34 .20	10.73 .20	48.87 .18	26.55 .24
14.5	32.37- .12	61.52 .33	23.01 .11	52.99 .27	51.46 +.05	10.91 .17	49.04 .15	26.77 .20
24.5	32.15 .31	62.24 .96	23.10 .07	53.20 .16	51.43- .10	11.06 .13	49.17 .11	26.94 .15
Dec. 4.4	31.75 .49	63.40 1.34	23.15 +.03	53.30 +.05	51.26 .25	11.16 .08	49.26 .07	27.06 .10
14.4	31.17- .65	64.93+1.68	23.17 .00	53.29- .07	50.93- .41	11.21 +.03	49.32 +.04	27.14 +.04
24.4	30.45 .79	66.77 1.97	23.15- .04	53.16 .19	50.44 .54	11.21- .02	49.34 .00	27.14- .02
34.4	29.58- .91	68.88+2.21	23.10- .07	52.90- .30	49.86- .66	11.17- .07	49.32- .04	27.10- .08
Mean Solar Date.	α <sup>4</sup> Eridani.	η Urs. Min., S. P.	δ Mensæ.	m Persei.	τ Tauri.	ι Tauri.	ζ Aurigæ.	β Eridani.
	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	97 6 4 6	345 59 4 20	170 27 4 24	47 9 4 26	67 14 4 36	71 20 4 45	49 4 4 55	95 13 5 2
(Dec. 30.4)	58.20- .04	21.08 +.45	53.65- .90	21.45- .02	13.43 .00	30.38 +.01	28.09 +.02	55.33 +.01
Jan. 9.4	58.15 .07	22.50 .60	52.64 1.09	21.40 .07	13.41- .04	30.37- .03	28.08- .03	55.32- .03
19.4	58.06 .10	23.18 .74	51.47 1.24	21.32 .12	13.36 .08	30.32 .07	28.03 .09	55.27 .07
29.3	57.95 .12	23.08 .83	50.15 1.37	21.17 .16	13.25 .12	30.24 .11	27.91 .14	55.18 .10
Feb. 8.3	57.80 .15	24.84 .89	48.74 1.45	21.00 .19	13.12 .14	30.11 .14	27.75 .18	55.06 .13
18.3	57.65- .17	25.77 +.94	47.26- 1.49	20.78- .22	12.97- .16	29.96- .16	27.56- .21	54.92- .15
28.3	57.47 .18	26.72 .94	45.76 1.50	20.55 .22	12.79 .18	29.79 .17	27.34 .22	54.75 .17
Mar. 10.2	57.30- .17	27.64 +.88	44.27- 1.45	20.33- .21	12.61- .19	29.61- .18	27.11- .23	54.57- .18
Oct. 15.6	60.34 +.21	21.09- .76	48.91+ .89	24.44 +.32	15.91 +.27	32.72 +.26	30.78 +.33	57.14 +.24
25.6	60.54 +.19	20.40- .62	49.69+ .68	24.74 +.29	16.17 +.24	32.97 +.24	31.10 +.31	57.37 +.23
Nov. 4.6	60.72 .16	19.85 .47	50.27 .45	25.02 .26	16.40 .21	33.21 .22	31.40 .23	57.60 .21
14.5	60.87 .13	19.46 .32	50.60+ .21	25.25 .22	16.60 .18	33.42 .19	31.67 .25	57.79 .18
24.5	60.99 .10	19.21- .16	50.69- .04	25.45 .17	16.77 .15	33.58 .15	31.90 .21	57.96 .15
Dec. 4.5	61.07 .06	19.14 +.02	50.53 .29	25.60 .12	16.91 .11	33.72 .12	32.08 .16	58.09 .12
14.5	61.11 +.02	19.25 +.20	50.11- .53	25.69 +.07	17.00 +.07	33.83 +.08	32.22 +.11	58.20 +.08
24.4	61.12- .01	19.54 .37	49.46 .76	25.74 +.02	17.04 +.03	33.89 +.04	32.30 .06	58.26 +.04
34.4	61.09- .05	19.99 +.53	48.59- .98	25.73- .03	17.05- .02	33.91- .01	32.33 +.01	58.28 .00

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\tau$ Orionis.	$\chi$ Aurigæ.	Groombr. 944.	$\kappa$ Orionis.	$\nu$ Aurigæ.	$\delta$ Doradus.	$\beta$ Aurigæ.	$\theta$ Aurigæ.
	° ' / 96 57 h m 5 12	° ' / 57 53 h m 5 26	° ' / 4 51 h m 5 29	° ' / 99 42 h m 5 42	° ' / 50 53 h m 5 44	° ' / 155 46 h m 5 44	° ' / 45 4 h m 5 52	° ' / 52 48 h m 5 52
(Dec. 30.5)	44.41 +.02	12.21 +.05	58.26-.18	60.26 +.04	32.46 +.07	38.98 -.13	10.64 +.09	53.17 +.09
Jan. 9.4	44.41 -.02	12.24 +.01	57.83 .67	60.29 .00	32.51 +.02	38.80 .22	10.70 +.03	53.23 +.03
19.4	44.37 .06	12.22 -.04	56.91 1.14	60.26 -.04	32.50 -.03	38.53 .32	10.69 -.03	53.23 -.02
29.4	44.29 .10	12.16 .09	55.55 1.57	60.20 .08	32.44 .09	38.16 .40	10.63 .09	53.18 .07
Feb. 8.3	44.16 .13	12.04 .14	53.78 1.92	60.09 .12	32.33 .14	37.73 .47	10.51 .15	53.08 .12
18.3	44.03 -.15	11.88 -.17	51.71-2.18	59.95 -.14	32.17 -.18	37.22 -.52	10.33 -.20	52.93 -.17
28.3	43.86 .17	11.70 .19	49.43 2.34	59.80 .16	31.97 .21	36.69 .55	10.12 .23	52.74 .20
Mar. 10.3	43.68 .18	11.50 .20	47.03 2.41	59.62 .18	31.75 .22	36.12 .57	9.88 .24	52.53 .21
20.3	43.50 -.18	11.30 -.20	44.62-2.40	59.44 -.18	31.54 -.22	35.55 -.57	9.64 -.24	52.33 -.20
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Oct. 25.6	46.36 +.25	14.81 +.30	68.35+2.60	61.99 +.26	35.07 +.36	37.78 +.46	13.33 +.38	55.69 +.34
Nov. 4.6	46.59 .22	15.10 .28	70.79 2.87	62.24 .24	35.41 .33	38.22 .40	13.70 .35	56.02 .32
14.6	46.80 .19	15.37 .25	72.90 1.94	62.47 .22	35.72 .29	38.58 .32	14.03 .32	56.33 .29
24.5	46.98 .16	15.61 .22	74.68 1.56	62.67 .19	35.99 .25	38.86 .24	14.34 .29	56.60 .26
Dec. 4.5	47.13 .12	15.82 .18	76.03 1.12	62.84 .16	36.23 .21	39.05 .14	14.60 .24	56.85 .22
14.5	47.22 +.08	15.97 +.13	76.91+ .63	62.98 +.12	36.42 +.16	39.13 +.04	14.82 +.19	57.05 +.18
24.5	47.29 -.05	16.08 .08	77.28+ .12	63.07 .07	36.56 .12	39.12 -.07	14.98 .13	57.20 .13
34.4	47.32 +.01	16.15 +.02	77.15-.38	63.12 +.03	36.65 +.07	39.00 -.17	15.08 +.06	57.30 +.07
Mean Solar Date.	$\eta$ Geminor.	$\psi$ Aurigæ.	$\chi$ Draconis, S. P.	$\nu$ Geminor.	$\epsilon$ Geminor.	$\psi$ Aurigæ.	$\theta$ Geminor.	$\zeta$ Mensæ.
	° ' / 67 28 h m 6 8	° ' / 40 40 h m 6 17	° ' / 342 41 h m 6 22	° ' / 69 43 h m 6 22	° ' / 64 46 h m 6 37	° ' / 46 19 h m 6 39	° ' / 55 55 h m 6 46	° ' / 170 42 h m 6 48
(Dec. 30.5)	49.62 +.09	10.93 +.13	47.63 +.05	60.65 +.10	45.88 +.13	30.92 +.15	11.02 +.15	34.00-.14
Jan. 9.5	49.69 +.04	11.03 +.06	47.72 .15	60.73 .06	45.98 .08	31.04 .09	11.14 .09	33.72 .39
19.4	49.71 -.01	11.05 -.01	47.95 .30	60.76 +.01	46.03 +.02	31.09 +.02	11.21 +.03	33.21 .63
29.4	49.67 .06	11.01 .08	48.32 .43	60.74 -.04	46.03 -.03	31.08 -.04	11.21 -.02	32.45 .86
Feb. 8.4	49.59 .09	10.90 .14	48.80 .53	60.68 .08	45.97 .08	31.01 .10	11.16 .07	31.48 1.06
18.4	49.49 -.13	10.74 -.19	49.37 +.62	60.58 -.12	45.88 -.12	30.89 -.15	11.06 -.12	30.32-1.22
28.3	49.34 .16	10.52 .24	50.05 .71	60.44 .15	45.75 .15	30.71 .19	10.92 .16	29.03 1.35
Mar. 10.3	49.17 .18	10.26 .26	50.79 .74	60.27 .17	45.58 .17	30.51 .22	10.74 .19	27.62 1.45
20.3	48.98 .19	10.00 .27	51.54 .76	60.09 .18	45.40 .18	30.28 .24	10.54 .20	26.13 1.50
30.2	48.80 .18	9.72 .27	52.31 .76	59.91 .18	45.21 .19	30.03 .25	10.34 .21	24.60 1.52
Apr. 9.2	48.62 -.16	9.46 -.25	53.07 +.75	59.74 -.16	45.03 -.18	29.79 -.24	10.12 -.22	23.08-1.52
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Nov. 14.6	52.35 +.26	14.31 +.37	47.95 -.55	63.25 +.27	48.51 +.30	33.96 +.36	13.79 +.33	27.23+ .98
24.6	52.60 .24	14.66 .34	47.44 .45	63.51 .25	48.80 .27	34.30 .33	14.11 .30	28.12 .76
Dec. 4.6	52.83 .21	14.98 .29	47.05 .34	63.75 .22	49.06 .24	34.62 .29	14.40 .27	28.79 .55
14.5	53.02 +.17	15.23 +.23	46.77 -.22	63.95 +.18	49.28 +.20	34.88 +.24	14.65 +.23	29.22+ .30
24.5	53.17 .13	15.44 .17	46.62 -.07	64.12 .14	49.46 .16	35.11 .19	14.85 .18	29.39+ .04
34.5	53.27 +.08	15.58 +.10	46.63 +.08	64.23 +.09	49.60 +.11	35.27 +.13	15.01 +.12	29.29-.22

# ADDITIONAL FIXED STARS, 1899.

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## APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Geminor.	63 Aurigæ.	γ <sup>2</sup> Volantis.	25 Camelop.	β Can. Min.	26 Lyncis.	Groombr. 1374.	ω <sup>1</sup> Cancr.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	69 17 6 58	50 31 7 4	160 20 7 9	7 24 7 9	81 30 7 21	42 10 7 47	15 49 7 48	64 20 7 54
(Dec. 30.5)	9.86 +.15	45.78 +.18	39.90 +.05	66.14 +.67	42.97 +.16	25.05 +.26	13.85 +.49	51.97 +.22
Jan. 9.5	9.98 .09	45.93 .12	39.90 -.06	66.64 +.32	43.10 .11	25.27 .19	14.26 .33	52.15 .16
19.5	10.05 +.04	46.02 +.06	39.77 .18	66.78 -.02	43.19 .06	25.42 .12	14.50 +.16	52.29 .10
29.4	10.06 -.01	46.04 -.01	39.53 .31	66.60 .36	43.22 +.01	25.51 +.05	14.58 .00	52.36 +.04
Feb. 8.4	10.03 .05	46.00 .07	39.17 .42	66.06 .69	43.20 -.04	25.51 -.03	14.50 -.17	52.38 -.01
18.4	9.96 -.10	45.91 -.12	38.70 -.50	65.22 -.98	43.14 -.08	25.44 -.10	14.24 -.33	52.34 -.06
28.4	9.83 .14	45.76 .16	38.15 .58	64.10 1.22	43.05 .11	25.31 .15	13.84 .45	52.27 .10
Mar. 10.3	9.69 .16	45.58 .20	37.54 .64	62.78 1.39	42.92 .14	25.13 .19	13.33 .56	52.15 .14
20.3	9.52 .18	45.37 .22	36.88 .67	61.31 1.50	42.77 .16	24.92 .23	12.72 .64	51.99 .16
30.3	9.34 .18	45.15 .22	36.20 .68	59.78 1.55	42.60 .17	24.68 .25	12.05 .69	51.82 .17
Apr. 9.2	9.16 -.17	44.93 -.21	35.51 -.68	58.20 1.55	42.43 -.17	24.42 -.25	11.34 -.71	51.65 -.17
19.2	8.99 -.16	44.76 -.19	34.85 -.64	56.67 1.48	42.27 -.15	24.17 -.24	10.63 -.70	51.48 -.15
Nov. 24.6	12.61 +.29	48.90 +.34	38.56 +.50	74.28 1.58	45.40 +.28	28.10 +.43	18.24 +.90	54.55 +.33
Dec. 4.6	12.88 .25	49.22 .30	39.00 .38	75.81 1.43	45.66 .25	28.51 .38	19.10 .81	54.87 .30
14.6	13.11 +.21	49.50 +.26	39.31 +.26	77.13 1.16	45.90 +.22	28.85 +.34	19.85 +.70	55.15 +.27
24.5	13.31 .17	49.74 .21	39.52 .14	78.12 .84	46.11 .18	29.17 .29	20.49 .58	55.41 .24
34.5	13.46 +.13	49.93 +.15	39.60 +.03	78.81 +.53	46.27 +.13	29.43 +.23	21.00 +.44	55.63 +.19
Mean Solar Date.	ζ <sup>1</sup> Cancr.	β Cancr.	30 Monocerotis.	θ Chamæleontis.	σ Hydræ.	γ Cancr.	σ <sup>2</sup> Cancr. (mean.)	θ Hydræ.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	72 3 8 6	80 30 8 11	93 35 8 20	167 10 8 23	86 18 8 33	68 10 8 37	59 2 8 48	87 16 9 9
(Dec. 30.6)	27.73 +.21	4.69 +.20	39.08 +.20	44.85 +.35	31.18 +.22	29.03 +.25	7.66 +.27	8.79 +.24
Jan. 9.5	27.91 .16	4.87 .16	39.26 .15	45.11 +.18	31.37 .17	29.25 .20	7.90 .22	9.02 .20
19.5	28.05 .11	5.01 .11	39.39 .11	45.20 .00	31.53 .13	29.42 .15	8.10 .17	9.20 .15
29.5	28.14 .06	5.09 .06	39.48 .06	45.12 -.18	31.63 .08	29.54 .09	8.23 .11	9.33 .11
Feb. 8.5	28.17 +.01	5.12 +.01	39.51 +.01	44.85 .35	31.68 +.03	29.60 +.04	8.31 +.05	9.42 .07
18.4	28.15 -.04	5.11 -.04	39.50 -.04	44.41 -.52	31.69 -.02	29.61 -.01	8.33 -.01	9.46 +.02
28.4	28.08 .09	5.05 .08	39.44 .08	43.80 .66	31.64 .06	29.57 .06	8.29 .06	9.45 -.03
Mar. 10.4	27.97 .12	4.95 .11	39.34 .11	43.08 .77	31.56 .10	29.49 .10	8.21 .10	9.40 .07
20.4	27.84 .14	4.82 .14	39.23 .13	42.25 .87	31.45 .13	29.37 .13	8.09 .13	9.31 .10
30.3	27.68 .16	4.67 .15	39.08 .15	41.35 .93	31.31 .14	29.23 .15	7.94 .15	9.20 .12
Apr. 9.3	27.52 -.17	4.52 -.16	38.92 -.16	40.38 -.98	31.16 -.15	29.07 -.16	7.78 -.17	9.07 -.13
19.3	27.35 .16	4.36 .16	38.76 .16	39.38 1.00	31.01 .15	28.91 .16	7.60 .18	8.93 .14
29.2	27.20 .15	4.20 .14	38.61 .15	38.38 1.00	30.86 .14	28.75 .15	7.43 .17	8.79 .14
May 9.2	27.06 -.13	4.07 -.12	38.47 -.13	37.39 -.98	30.72 -.12	28.60 -.14	7.26 -.15	8.65 -.13

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Argus.	$\alpha$ Lyncis.	$\iota$ Leonis Minoris.	$\sigma$ Leonis.	$\zeta$ Chamæ- leontis.	$\rho$ Leonis Minoris.	$\pi$ Leonis.	$\lambda$ Ursæ Ma- joris.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	159 18 9 12	55 11 9 14	53 9 9 28	79 39 9 35	170 29 9 36	48 28 9 51	81 28 9 54	46 35 10 11
(Dec. 30.6)	8.61 +.40	56.74 +.30	4.85 +.32	47.74 +.27	57.09+ .88	32.57 +.35	54.59 +.28	2.85 +.37
Jan. 9.6	8.96 .30	57.02 .25	5.14 .27	47.99 .23	57.87 .66	32.90 .31	54.85 .24	3.20 .33
19.6	9.20 .19	57.25 .20	5.40 .22	48.20 .19	58.42 .43	33.19 .26	55.08 .20	3.51 .28
29.5	9.33 +.07	57.42 .14	5.59 .16	48.37 .14	58.73+ .20	33.41 .19	55.26 .16	3.76 .22
Feb. 8.5	9.33 -.05	57.53 .08	5.72 .10	48.49 .09	58.81-. .03	33.57 .13	55.40 .11	3.95 .16
18.5	9.22 -.16	57.58 +.02	5.79 +.04	48.55 +.05	58.66-. .26	33.67 +.07	55.48 +.06	4.07 +.10
28.5	9.01 .27	57.58 -.03	5.79 -.02	48.58 .00	58.29 .47	33.71 +.01	55.52 +.01	4.14 +.03
Mar. 10.4	8.68 .36	57.52 .08	5.75 .07	48.55 -.05	57.71 .66	33.69 -.05	55.51 -.03	4.13 -.03
20.4	8.29 .42	57.41 .12	5.65 .12	48.48 .08	56.96 .83	33.60 .10	55.46 .07	4.07 .09
30.4	7.83 .49	57.27 .15	5.52 .15	48.39 .11	56.05 .98	33.48 .14	55.38 .09	3.95 .13
Apr. 9.3	7.32 -.52	57.11 -.17	5.36 -.17	48.27 -.13	55.00-1.09	33.33 -.17	55.28 -.12	3.81 -.16
19.3	6.78 .55	56.93 .18	5.19 .19	48.14 .14	53.87 1.17	33.15 .19	55.15 .13	3.64 .18
29.3	6.22 .56	56.75 .19	4.99 .19	48.00 .13	52.66 1.23	32.95 .20	55.03 .13	3.44 .20
May 9.3	5.66 .56	56.56 .17	4.82 .17	47.87 .13	51.41 1.24	32.76 .20	54.90 .13	3.24 .20
19.2	5.10 -.55	56.40 -.16	4.65 -.16	47.74 -.12	50.18-1.24	32.56 -.19	54.77 -.12	3.04 -.19
Mean Solar Date.	$\mu$ Hydræ.	$\beta$ Leonis Minoris.	$\alpha$ Antilæ.	$\beta$ Octantis, S. P.	$\epsilon$ Leonis Minoris.	$\delta$ Chamæ- leontis.	$\epsilon$ Leonis Minoris.	Groombr. 1706.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	106 19 10 21	52 47 10 22	120 33 10 22	188 5 10 35	66 17 10 37	170 0 10 44	55 14 10 47	11 41 10 51
Jan. 19.6	14.67 +.22	5.53 +.26	34.07 +.22	40.43-. .72	58.00 +.26	56.07+ .80	42.49 +.28	60.00 +.90
29.6	14.88 .18	5.77 .21	34.27 .18	39.83 .47	58.23 .21	56.78 .60	42.75 .23	60.84 .75
Feb. 8.6	15.03 .13	5.96 .16	34.43 .12	39.48-. .23	58.42 .16	57.29 .39	42.96 .18	61.50 .56
18.5	15.13 .08	6.09 .10	34.53 .07	39.38 .00	58.56 .11	57.57+ .19	43.12 .13	61.96 .35
28.5	15.18 +.03	6.17 +.04	34.58 +.02	39.49+ .24	58.64 .06	57.67-. .01	43.23 .08	62.19 +.14
Mar. 10.5	15.19 -.01	6.17 -.01	34.58 -.02	39.86+ .48	58.67 +.01	57.55-. .21	43.27 +.02	62.22 -.07
20.4	15.17 .05	6.14 .06	34.54 .06	40.45 .70	58.66 -.03	57.24 .40	43.26 -.03	62.04 .38
30.4	15.10 .08	6.05 .10	34.47 .09	41.26 .91	58.61 .07	56.75 .56	43.21 .07	61.66 .47
Apr. 9.4	15.01 .10	5.93 .13	34.36 .12	42.28 1.10	58.53 .09	56.11 .71	43.12 .10	61.10 .62
19.4	14.90 .11	5.79 .15	34.23 .14	43.46 1.26	58.43 .11	55.33 .83	43.01 .13	60.42 .75
29.3	14.78 -.12	5.63 -.17	34.09 -.15	44.80+1.39	58.31 -.13	54.44-. .94	42.86 -.15	59.61 -.84
May 9.3	14.66 .12	5.45 .18	33.94 .15	46.25 1.50	58.16 .14	53.44 1.03	42.71 .16	58.73 .91
19.3	14.53 .13	5.28 .17	33.79 .15	47.81 1.59	58.03 .13	52.39 1.08	42.55 .16	57.79 .94
29.3	14.40 .12	5.12 .16	33.63 .14	49.43 1.62	57.90 .13	51.29 1.12	42.39 .15	56.85 .94
June 8.2	14.28 -.11	4.96 -.14	33.50 -.12	51.05+1.59	57.78 -.11	50.16-1.14	42.25 -.14	55.92 -.91

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Octantis.	$\rho^2$ Leonis.	$\psi$ Urs. Maj.	$\nu$ Urs. Maj.	$\xi$ Hydræ.	$\chi$ Urs. Maj.	$\pi$ Virginis.	$\epsilon$ Corvi.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	174 3 11	87 30 11	44 57 11	56 21 11	121 18 11	41 40 11	82 49 11	112 3 12
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Feb. 8.6	13.06+ .75	47.62 +.17	2.50 +.23	4.60 +.22	4.59 +.20	46.34 +.28	44.25 +.22	58.24 +.23
18.6	13.66 .43	47.76 .13	2.70 .17	4.79 .16	4.77 .16	46.60 .22	44.45 .18	58.45 .19
28.5	13.91+ .10	47.88 .09	2.84 .10	4.92 .10	4.91 .11	46.78 .15	44.62 .14	58.62 .15
Mar. 10.5	13.84- .22	47.93 +.04	2.90 +.04	5.00 +.05	4.99 .06	46.90 .09	44.73 .09	58.75 .11
20.5	13.46 .54	47.95 .00	2.91 -.02	5.01 .00	5.03 +.02	46.95 +.02	44.80 .05	58.83 .07
30.4	12.78- .83	47.92 -.03	2.85 -.07	4.99 -.04	5.03 -.01	46.95 -.04	44.84 +.02	58.88 +.03
Apr. 9.4	11.82 1.09	47.88 .06	2.76 .11	4.93 .08	5.00 .05	46.88 .09	44.84 -.01	58.89 .00
19.4	10.60 1.32	47.80 .08	2.64 .14	4.84 .11	4.93 .08	46.77 .13	44.81 .04	58.87 -.03
29.4	9.16 1.52	47.71 .10	2.47 .16	4.71 .13	4.85 .10	46.63 .16	44.75 .06	58.84 .06
May 9.3	7.54 1.68	47.61 .11	2.29 .19	4.58 .14	4.74 .12	46.45 .18	44.68 .07	58.77 .08
19.3	5.80-1.80	47.50 -.11	2.09 -.20	4.43 -.15	4.62 -.13	46.26 -.20	44.60 -.08	58.68 -.09
29.3	3.95 1.87	47.39 .11	1.89 .20	4.28 .15	4.49 .14	46.05 .22	44.51 .10	58.60 .10
June 8.3	2.05 1.89	47.28 .10	1.69 .19	4.12 .15	4.34 .14	45.82 .22	44.39 .11	58.49 .11
18.2	0.16-1.89	47.18 -.10	1.51 -.18	3.98 -.14	4.21 -.13	45.62 -.20	44.29 -.09	58.38 -.11
Mean Solar Date.	2 Can. Ven.	6 Urs. Min.	$\delta^2$ Corvi.	$\beta$ Can. Ven.	$\gamma$ Virginis, (mean.)	31 Comæ Berenices.	$\gamma$ Cassiop., S. P.	43 Cephei, S. P.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	48 47 12	1 44 12	105 57 12	48 6 12	90 54 12	61 55 12	330 10 12	355 43 12
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Feb. 8.6	6.74 +.28	55.72+5.42	40.77 +.24	59.43 +.31	34.83 +.25	49.19 +.28	36.59 -.30	46.62-2.29
18.6	7.00 .23	60.61 4.31	40.99 .20	59.70 .25	35.06 .21	49.45 .24	36.33 .23	44.51 1.91
28.6	7.20 .18	64.28 3.07	41.17 .16	59.93 .20	35.25 .17	49.67 .20	36.14 .16	42.81 1.49
Mar. 10.5	7.35 .13	66.68 1.70	41.31 .12	60.10 .14	35.40 .13	49.85 .15	36.01 .10	41.54 1.02
20.5	7.45 .07	67.65+ .28	41.42 .08	60.22 .09	35.51 .09	49.97 .10	35.94 -.03	40.77- .49
30.5	7.48 +.02	67.23-1.13	41.48 +.05	60.28 +.04	35.59 +.06	50.05 +.06	35.95 +.05	40.55+ .07
Apr. 9.5	7.48 -.03	65.43 2.48	41.51 +.02	60.29 -.01	35.63 +.03	50.10 +.02	36.06 .13	40.89 .61
19.4	7.43 .07	62.36 3.72	41.51 -.01	60.26 .05	35.64 .00	50.10 -.01	36.24 .22	41.76 1.11
29.4	7.34 .11	58.12 4.81	41.49 .03	60.18 .09	35.62 -.03	50.08 .04	36.50 .31	43.13 1.60
May 9.4	7.22 .13	52.90 5.72	41.45 .05	60.08 .12	35.59 .05	50.01 .07	36.86 .38	44.96 2.01
19.4	7.07 -.15	46.86-6.42	41.38 -.07	59.94 -.15	35.53 -.06	49.94 -.09	37.27 +.43	47.18+2.37
29.3	6.92 .16	40.24 6.90	41.30 .08	59.79 .16	35.47 .08	49.84 .10	37.72 .47	49.70 2.65
June 8.3	6.74 .17	33.21 7.19	41.21 .09	59.62 .17	35.39 .09	49.73 .11	38.22 .52	52.46 2.84
18.3	6.57 -.17	26.00-7.32	41.11 -.10	59.44 -.18	35.29 -.10	49.61 -.12	38.77 +.54	55.38+2.91

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
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Mean Solar Date.	$\delta$ Muscæ.	$\epsilon$ Virginis.	$\alpha$ Can. Ven.	$\kappa$ Octantis.	B.A.C. 4536.	$m$ Virginis.	$\theta$ Apodis.	$\pi$ Hydræ.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	161 0 12 55	78 30 12 57	48 54 13 13	175 16 13 24	52 18 13 30	98 12 13 36	166 19 13 55	116 12 14 0
Mar. 0.6	25.82 +.44	11.63 +.19	3.65 +.24	49.91 +1.93	19.82 +.24	21.14 +.23	35.13 +.88	39.66 +.26
10.6	26.22 .35	11.80 .15	3.86 .19	51.66 1.58	20.06 .20	21.34 .19	35.91 .73	39.90 .23
20.6	26.52 .26	11.94 .11	4.04 .14	53.07 1.28	20.23 .16	21.52 .16	36.58 .60	40.12 .20
30.5	26.74 .17	12.03 .07	4.14 .09	54.10 .84	20.37 .12	21.66 .12	37.11 .46	40.30 .16
Apr. 9.5	26.85 +.07	12.09 .04	4.22 +.05	54.74 .45	20.47 .07	21.77 .09	37.50 .33	40.44 .13
19.5	26.87 -.02	12.12 +.01	4.24 .00	55.00 +.06	20.51 +.02	21.84 +.06	37.77 +.20	40.55 +.10
29.4	26.80 .11	12.11 -.02	4.22 -.04	54.87 -.32	20.51 -.02	21.88 +.03	37.91 +.07	40.64 .07
May 9.4	26.64 .20	12.09 .04	4.16 .07	54.35 .70	20.48 .05	21.90 .00	37.91 -.06	40.68 .04
19.4	26.40 .28	12.04 .06	4.06 .10	53.46 1.05	20.41 .08	21.89 -.02	37.79 .19	40.70 +.01
29.4	26.09 .35	11.96 .08	3.95 .13	52.24 1.36	20.32 .11	21.86 .04	37.55 .31	40.70 -.02
June 8.3	25.71 -.41	11.88 -.09	3.81 -.15	50.72 -1.65	20.20 -.13	21.82 -.05	37.18 -.42	40.67 -.05
18.3	25.28 .45	11.79 .10	3.64 .17	48.94 1.89	20.06 .15	21.76 .07	36.70 .32	40.60 .07
28.3	24.80 .47	11.68 .11	3.47 .18	46.96 2.07	19.91 .17	21.67 .09	36.14 .60	40.51 .09
July 8.3	24.33 -.47	11.57 -.11	3.28 -.19	44.79 -2.21	19.73 -.18	21.57 -.10	35.50 -.65	40.42 -.10
Mean Solar Date.	$\delta$ Bootis.	$\kappa$ Virginis.	$\gamma$ Urs. Min.	$\delta$ Octantis.	$\lambda$ Bootis.	$\lambda$ Virginis.	$\mu$ Hydri, S. P.	$\alpha$ Apodis.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	64 26 14 5	99 48 14 7	11 59 14 9	173 12 14 10	43 27 14 12	102 54 14 13	190 27 14 33	168 37 14 35
Mar. 20.6	50.38 +.19	33.31 +.19	19.52 +.58	55.99 +1.24	35.55 +.22	41.49 +.19	41.83 -.86	27.32 +.88
30.6	50.55 .15	33.48 .15	20.00 .39	57.12 1.01	35.74 .17	41.67 .16	41.05 .70	28.14 .75
Apr. 9.5	50.67 .11	33.62 .12	20.29 .20	58.01 .74	35.89 .12	41.81 .13	40.44 .52	28.81 .60
19.5	50.76 .07	33.72 .09	20.40 +.02	58.61 .47	35.99 .07	41.93 .10	40.02 .33	29.33 .44
29.5	50.82 .04	33.80 .06	20.33 -.17	58.95 +.20	36.03 +.02	42.01 .07	39.79 -.14	29.68 .28
May 9.5	50.84 +.01	33.84 +.03	20.06 -.35	59.02 -.07	36.03 -.03	42.08 +.04	39.74 +.06	29.88 +.12
19.4	50.83 -.03	33.87 +.01	19.63 .50	58.81 .34	35.97 .07	42.10 +.01	39.91 .26	29.92 -.04
29.4	50.79 .05	33.88 -.02	19.06 .63	58.34 .60	35.89 .10	42.11 -.01	40.26 .45	29.79 .21
June 8.4	50.73 .07	33.85 .04	18.36 .75	57.61 .85	35.77 .14	42.08 .03	40.80 .62	29.49 .37
18.3	50.65 .09	33.80 .06	17.55 .85	56.64 1.06	35.61 .17	42.04 .06	41.50 .77	29.05 .49
28.3	50.54 -.11	33.73 -.08	16.65 -.93	55.49 -1.23	35.43 -.19	41.98 -.08	42.35 +.91	28.48 -.58
July 8.3	50.41 .13	33.64 .10	15.69 .98	54.17 1.39	35.22 .21	41.89 .10	43.32 1.03	27.79 .75
18.3	50.28 .14	33.53 .11	14.69 1.01	52.70 1.53	35.00 .22	41.78 .11	44.42 1.12	27.00 .83
28.2	50.13 -.15	33.41 -.12	13.67 -1.02	51.11 -1.64	34.76 -.23	41.66 -.12	45.56 +1.14	26.13 -.90

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
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Mean Solar Date.	33 Bootis.	47 Cephei, S. P.	$\gamma$ Scorpii.	$\delta$ Bootis.	$\rho$ Octantis.	$\beta$ Cor. Bor.	$\gamma$ Camelop., S. P.	$\delta$ Apodis.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	14 35	14 52	14 58	15 11	15 20	15 23	15 39	16 5
Mar. 30.6	7.65 +.20	37.18-.48	12.58 +.22	28.56 +.22	14.95+1.79	42.51 +.22	42.07 -.40	23.81+1.11
Apr. 9.6	7.83 .15	36.80 .29	12.78 .19	28.76 .18	16.60 1.51	42.72 .19	41.74 .27	24.86 .99
19.5	7.95 .10	36.61-.08	12.95 .16	28.92 .14	17.96 1.22	42.89 .15	41.54 .14	25.79 .86
29.5	8.02 .06	36.65+.14	13.10 .13	29.04 .10	19.03 .91	43.03 .11	41.46 -.02	26.57 .71
May 9.5	8.06 +.01	36.89 .36	13.21 .10	29.12 .07	19.77 .59	43.12 .08	41.51 +.11	27.21 .56
19.5	8.04 -.04	37.38+.58	13.29 +.07	29.17 +.03	20.19+.25	43.19 +.05	41.68 +.24	27.69+.39
29.4	7.98 .08	38.05 .76	13.34 +.03	29.18 -.01	20.27-.08	43.22 +.02	42.00 .37	27.99 .22
June 8.4	7.89 .11	38.89 .91	13.35 .00	29.16 .04	20.02 .41	43.21 -.02	42.42 .48	28.12+.05
18.4	7.76 .14	39.88 1.06	13.33 -.03	29.10 .07	19.43 .72	43.17 .06	42.96 .57	28.08-.13
28.3	7.61 .17	41.00 1.18	13.30 -.06	29.00 .11	18.55 1.03	43.09 .09	43.57 .65	27.85 .31
July 8.3	7.41 -.20	42.22+1.25	13.22 -.09	28.88 -.14	17.36-1.30	42.99 -.12	44.27 +.73	27.45-.47
18.3	7.20 .21	43.50 1.29	13.12 .11	28.73 .16	15.95 1.53	42.86 .14	45.03 .78	26.91 .60
28.3	6.98 .23	44.81 1.32	13.00 .13	28.57 .18	14.29 1.72	42.71 .16	45.82 .80	26.24 .73
Aug. 7.2	6.73 .24	46.14 1.32	12.85 .15	28.37 .20	12.51 1.82	42.53 .18	46.64 .81	25.45 .83
17.2	6.49 .24	47.44 1.28	12.70 .16	28.17 .20	10.66 1.86	42.32 .19	47.45 .81	24.57 .90
27.2	6.25 -.23	48.71+1.25	12.53 -.17	27.97 -.20	8.80-1.86	42.15 -.18	48.26 +.79	23.65-.94
Mean Solar Date.	$\phi$ Herculis.	$\sigma$ Cor. Bor. (mean.)	$\gamma$ Apodis.	$\eta$ Urs. Min.	$\eta$ Ophiuchi.	$\pi$ Herculis.	$\theta$ Ophiuchi.	$\delta$ Aræ.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	16 5	16 10	16 18	16 20	17 4	17 11	17 15	17 22
Apr. 9.6	37.52 +.26	56.24 +.24	8.03+1.04	30.03 +.63	37.89 +.28	33.93 +.29	51.31 +.32	3.50 +.55
19.6	37.75 .21	56.46 .20	9.01 .93	30.59 .50	38.16 .25	34.21 .26	51.61 .28	4.02 .50
29.6	37.94 .17	56.64 .16	9.88 .78	31.02 .35	38.40 .23	34.46 .23	51.87 .25	4.49 .45
May 9.6	38.08 .13	56.78 .13	10.57 .62	31.29 .20	38.62 .20	34.67 .20	52.11 .23	4.93 .40
19.5	38.19 .09	56.90 .09	11.12 .46	31.42 +.05	38.81 .18	34.85 .16	52.33 .20	5.29 .34
29.5	38.24 +.03	56.97 +.05	11.48+.29	31.39 -.10	38.98 +.15	34.99 +.12	52.52 +.17	5.61 +.28
June 8.5	38.25 -.02	57.00 +.01	11.69+.21	31.21 .26	39.12 .12	35.08 .08	52.68 .14	5.85 .21
18.4	38.21 .06	57.00 -.03	11.69-.08	30.87 .41	39.22 .08	35.14 +.04	52.80 .10	6.03 .14
28.4	38.11 .11	56.94 .07	11.52 .26	30.40 .53	39.28 +.04	35.15 -.01	52.87 .05	6.12 +.07
July 8.4	37.98 .15	56.86 .10	11.17 .43	29.81 .65	39.29 .00	35.11 .06	52.91 +.01	6.16 -.01
18.4	37.81 -.18	56.74 -.13	10.66-.58	29.10 -.75	39.28 -.04	35.03 -.10	52.90 -.03	6.11 -.09
28.3	37.61 .21	56.59 .16	10.00 .71	28.31 .83	39.22 .08	34.91 .14	52.85 .07	5.98 .16
Aug. 7.3	37.37 .24	56.41 .19	9.23 .83	27.44 .90	39.13 .11	34.74 .18	52.76 .11	5.78 .23
17.3	37.12 .26	56.20 .21	8.34 .92	26.52 .94	39.01 .14	34.54 .21	52.63 .14	5.52 .29
27.3	36.84 .27	55.98 .22	7.40 .96	25.56 .96	38.86 .16	34.32 .23	52.48 .16	5.20 .34
Sept. 6.2	36.57 -.28	55.76 -.22	6.43-.96	24.59 -.96	38.70 -.17	34.08 -.24	52.30 -.18	4.84 -.36
16.2	36.29 .27	55.54 .22	5.48 .93	23.64 .92	38.52 .17	33.84 .25	52.11 .18	4.49 .36
26.2	36.03 .24	55.32 .23	4.59 .85	22.75 .87	38.35 .16	33.59 .24	51.93 .18	4.12 .35
Oct. 6.1	35.81 -.20	55.07 -.24	3.79-.75	21.91 -.80	38.20 -.15	33.35 -.23	51.76 -.17	3.79 -.30



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Mean Solar Date.	Groombr. 944. S. P.	ε Herculis.	θ Herculis.	ο Herculis.	λ Sagittarii.	χ Draconis	ζ Pavonis.	γ Lyrae.
	°	°	°	°	°	°	°	°
	h m 17 29	h m 17 36	h m 17 52	h m 18 3	h m 18 21	h m 18 22	h m 18 31	h m 18 55
May 19.6	34.98- .46	39.94 +.19	50.26 +.20	39.13 +.20	48.08 +.26	55.52 +.41	22.26 +.66	12.68 +.26
29.6	34.75 .00	40.11 .14	50.44 .16	39.32 .17	48.32 .23	55.88 .31	22.87 .57	12.92 .23
June 8.5	34.98+ .46	40.22 .09	50.58 .12	39.48 .14	48.54 .20	56.13 .19	23.40 .47	13.14 .19
18.5	35.67 .91	40.29 +.04	50.68 .08	39.59 .10	48.72 .16	56.26 +.07	23.81 .35	13.31 .13
28.5	36.81 1.34	40.31 -.01	50.73 +.03	39.67 .06	48.86 .12	56.27 -.06	24.10 .24	13.43 .10
July 8.5	38.35+1.73	40.27 -.06	50.74 -.02	39.70 +.01	48.96 +.08	56.14 -.19	24.28 +.12	13.51 +.06
18.4	40.25 2.06	40.18 .11	50.69 .06	39.69 -.04	49.01 +.03	55.89 .31	24.34 .00	13.55 +.01
28.4	42.47 2.36	40.04 .16	50.61 .11	39.63 .08	49.01 -.02	55.52 .42	24.27 -.13	13.53 -.04
Aug. 7.4	44.99 2.62	39.85 .20	50.47 .15	39.53 .12	48.97 .06	55.04 .52	24.07 .25	13.47 .09
17.3	47.72 2.80	39.63 .24	50.30 .18	39.39 .16	48.89 .10	54.49 .60	23.76 .36	13.36 .13
27.3	50.59+2.94	39.37 -.27	50.10 -.21	39.22 -.18	48.77 -.14	53.83 -.68	23.35 -.45	13.21 -.17
Sept. 6.3	53.61 3.05	39.08 .29	49.87 .24	39.03 .20	48.61 .16	53.12 .74	22.85 .53	13.03 .19
16.3	56.68 3.07	38.78 .30	49.61 .25	38.82 .21	48.43 .18	52.35 .78	22.29 .58	12.83 .21
26.2	59.75 3.04	38.48 .29	49.36 .25	38.60 .22	48.24 .19	51.56 .79	21.70 .59	12.61 .22
Oct. 6.2	62.75 2.96	38.19 .28	49.11 .25	38.38 .22	48.06 .18	50.77 .79	21.10 .60	12.38 .23
16.2	65.67+2.84	37.92 -.24	48.87 -.23	38.17 -.20	47.88 -.17	49.98 -.77	20.50 -.58	12.15 -.22
Mean Solar Date.	ε Lyrae.	25 Camelop. S. P.	θ Lyrae.	β Cygni.	β Sagittae.	δ Cygni.	Groombr. 1374. S. P.	ε Pavonis.
	°	°	°	°	°	°	°	°
	h m 19 3	h m 19 9	h m 19 12	h m 19 26	h m 19 36	h m 19 41	h m 19 48	h m 19 49
May 29.6	44.83 +.24	52.13- .68	54.54 +.25	41.83 +.25	33.77 +.25	51.85 +.20	8.41 -.37	2.74 +.77
June 8.6	45.06 .20	51.60 .38	54.77 .21	42.06 .22	34.01 .23	52.13 .25	8.10 .25	3.47 .69
18.6	45.24 .16	51.37- .09	54.96 .17	42.27 .18	34.23 .20	52.36 .20	7.90 -.13	4.11 .59
28.5	45.37 .11	51.42+ .19	55.11 .12	42.44 .14	34.41 .16	52.54 .15	7.84 .00	4.65 .48
July 8.5	45.46 .06	51.76 .47	55.21 .07	42.55 .09	34.54 .12	52.67 .10	7.91 +.13	5.07 .35
18.5	45.49 +.01	52.37+ .74	55.25 +.02	42.63 +.05	34.63 +.07	52.75 +.04	8.10 +.25	5.35 +.21
28.4	45.48 -.04	53.25 1.00	55.25 -.03	42.65 .00	34.68 +.02	52.75 -.02	8.42 .38	5.49 +.07
Aug. 7.4	45.42 .09	54.37 1.22	55.19 .08	42.63 -.05	34.68 -.02	52.71 .07	8.87 .49	5.49 -.07
17.4	45.31 .13	55.69 1.42	55.08 .13	42.56 .09	34.64 .06	52.62 .12	9.40 .58	5.35 .21
27.4	45.16 .17	57.22 1.62	54.93 .17	42.45 .13	34.55 .10	52.48 .17	10.04 .69	5.08 .33
Sept. 6.3	44.98 -.20	58.94+1.78	54.74 -.20	42.30 -.16	34.44 -.13	52.28 -.21	10.79 +.78	4.68 -.46
16.3	44.77 .22	60.77 1.89	54.53 .22	42.13 .19	34.29 .16	52.05 .24	11.60 .85	4.17 .55
26.3	44.53 .24	62.71 1.98	54.29 .24	41.93 .20	34.12 .17	51.80 .26	12.48 .91	3.59 .61
Oct. 6.3	44.29 .24	64.72 2.04	54.04 .25	41.72 .21	33.94 .18	51.53 .27	13.42 .96	2.95 .65
16.2	44.05 .24	66.76 2.03	53.79 .24	41.51 .21	33.75 .19	51.25 .28	14.39 .97	2.28 .67
26.2	43.81 -.22	68.77+1.99	53.55 -.23	41.31 -.20	33.57 -.18	50.97 -.28	15.36 +.98	1.61 -.65
Nov. 5.2	43.61 -.19	70.76+1.94	53.33 -.20	41.12 -.19	33.41 -.17	50.69 -.27	16.35 +.99	0.97 -.60

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Mean Solar Date.	$\gamma$ Sagittæ.	$\epsilon$ Sagittarii.	$\theta$ Aquilæ.	$\zeta$ Cygni.	$\alpha$ Delphini.	$\beta$ Pavonis.	$\psi$ Capricor.	$\epsilon$ Cygni.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	19 54	19 56	20 6	20 10	20 34	20 35	20 40	20 42
June 18.6	19.33 +.21	31.21 +.25	9.22 +.22	30.26 +.23	60.15 +.24	58.62 +.33	10.96 +.28	10.65 +.26
28.6	19.52 .17	31.45 .21	9.42 .19	30.47 .19	60.37 .21	59.12 .46	11.22 .25	10.89 .22
July 8.5	19.67 .13	31.64 .17	9.60 .13	30.65 .14	60.56 .17	59.53 .37	11.45 .21	11.10 .18
18.5	19.78 .09	31.79 .13	9.73 .10	30.76 .08	60.71 .13	59.85 .28	11.64 .16	11.25 .13
28.5	19.84 +.04	31.89 .08	9.82 .06	30.80 +.02	60.81 .08	60.08 .18	11.78 .11	11.35 .08
Aug. 7.5	19.86 -.01	31.94 +.02	9.86 +.02	30.81 -.03	60.87 +.04	60.20 +.07	11.86 +.06	11.40 +.03
17.4	19.83 .05	31.92 -.03	9.86 -.02	30.74 .09	60.89 .00	60.21 -.03	11.90 +.01	11.41 -.02
27.4	19.76 .09	31.87 .08	9.82 .06	30.62 .14	60.86 -.05	60.13 .14	11.89 -.04	11.37 .07
Sept. 6.4	19.65 .12	31.78 .12	9.74 .10	30.45 .19	60.79 .09	59.94 .23	11.83 .08	11.28 .11
16.4	19.52 .13	31.65 .13	9.63 .13	30.25 .23	60.69 .12	59.67 .31	11.74 .12	11.15 .13
26.3	19.35 -.17	31.49 -.17	9.49 -.14	30.00 -.26	60.55 -.14	59.31 -.39	11.61 -.14	10.98 -.17
Oct. 6.3	19.17 .18	31.31 .18	9.34 .13	29.73 .27	60.40 .16	58.89 .44	11.46 .16	10.81 .19
16.3	18.99 .19	31.12 .19	9.18 .16	29.46 .28	60.23 .17	58.44 .46	11.28 .17	10.60 .20
26.2	18.80 .18	30.94 .18	9.02 .16	29.18 .28	60.06 .17	57.97 .47	11.11 .17	10.40 .21
Nov. 5.2	18.63 .16	30.77 .16	8.86 .14	28.90 .27	59.90 .16	57.50 .45	10.94 .16	10.19 .20
15.2	18.48 -.13	30.62 -.13	8.73 -.12	28.64 -.23	59.75 -.13	57.06 -.42	10.78 -.13	9.99 -.19
25.2	18.37 -.09	30.50 -.12	8.62 -.10	28.41 -.22	59.61 -.13	56.66 -.38	10.64 -.13	9.81 -.17
Mean Solar Date.	$\tau$ Cygni.	$\zeta$ Capricor.	$\eta$ Cygni.	$\lambda^1$ Octantis.	$\zeta$ Chamæle- ontis, S.P.	$\pi^2$ Cygni.	$\iota$ Pegasi.	$\pi$ Pegasi.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	21 10	21 20	21 32	21 35	21 36	21 43	21 48	22 5
July 8.6	49.13 +.21	58.33 +.24	57.56 +.23	43.15 +.35	44.65-.80	7.24 +.27	31.49 +.24	33.55 +.26
18.6	49.32 .16	58.55 .20	57.77 .19	44.38 1.09	43.94 .63	7.49 .22	31.71 .20	33.79 .22
28.5	49.45 .11	58.73 .13	57.93 .14	45.33 .81	43.39 .43	7.68 .16	31.88 .13	33.98 .17
Aug. 7.5	49.55 .06	58.85 .10	58.06 .09	45.99 .48	43.08 .22	7.81 .10	32.01 .11	34.14 .13
17.5	49.58 +.01	58.93 .06	58.11 +.03	46.29+.13	42.96-.01	7.88 +.04	32.11 .07	34.24 .08
27.5	49.56 -.04	58.96 +.01	58.12 -.02	46.28-.18	43.06+.23	7.88 -.01	32.15 +.02	34.30 +.04
Sept. 6.4	49.50 .09	58.95 -.04	58.07 .07	45.92 .53	43.44 .47	7.85 .07	32.14 -.03	34.31 -.01
16.4	49.39 .13	58.89 .08	57.99 .11	45.21 .85	44.01 .68	7.75 .12	32.09 .07	34.28 .06
26.4	49.24 .16	58.79 .11	57.86 .13	44.21 1.13	44.78 .88	7.60 .17	32.01 .10	34.20 .10
Oct. 6.4	49.06 .18	58.67 .13	57.69 .17	44.95 1.37	45.77 1.07	7.40 .20	31.90 .12	34.09 .12
16.3	48.87 -.20	58.52 -.13	57.51 -.19	44.47-1.53	46.93+1.22	7.19 -.23	31.77 -.14	33.96 -.14
26.3	48.66 .21	58.36 .16	57.30 .21	39.84 1.68	48.22 1.32	6.95 .25	31.61 .16	33.80 .16
Nov. 5.3	48.45 .21	58.20 .16	57.09 .21	38.10 1.74	49.58 1.38	6.69 .26	31.45 .16	33.63 .17
15.2	48.24 .20	58.04 .13	56.88 .20	36.35 1.74	50.99 1.40	6.43 .26	31.28 .16	33.45 .18
25.2	48.05 .19	57.90 .14	56.68 .20	34.62 1.67	52.38 1.36	6.17 .25	31.13 .13	33.28 .17
Dec. 5.2	47.87 -.17	57.77 -.12	56.48 -.19	33.01-1.33	53.71+1.27	5.93 -.23	30.99 -.13	33.12 -.15

**APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.**

Mean Solar Date.	$\nu$ Octantis.	$\gamma$ Aquarii.	$\sigma$ Aquarii.	$\alpha$ Lacertæ.	$\iota\alpha$ Lacertæ.	$\beta$ Octantis.	$\lambda$ Pegasi.	Groombr. 1706, S.P.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	176 29 22 12	91 54 22 16	101 12 22 25	40 14 22 27	51 29 22 34	171 55 22 35	66 58 22 41	348 19 22 51
July 8.6	47.96+2.87	29.98 +.26	21.77 +.26	11.24 +.32	47.14 +.29	55.75+1.36	43.32 +.27	53.48- .71
18.6	50.64 2.44	30.22 .22	22.02 .23	11.55 .27	47.41 .23	57.03 1.20	43.58 .24	52.85 .56
28.6	52.83 1.92	30.42 .18	22.24 .20	11.81 .22	47.64 .21	58.15 1.00	43.81 .20	52.36 .42
Aug. 7.6	54.47 1.35	30.58 .14	22.42 .15	12.00 .17	47.84 .17	59.04 .76	43.99 .16	52.01 .29
17.5	55.53 .74	30.71 .10	22.54 .10	12.14 .11	47.98 .12	59.68 .50	44.13 .12	51.78 .16
27.5	55.94+ .07	30.79 +.05	22.63 +.07	12.21 +.05	48.08 +.07	60.04+ .23	44.23 +.08	51.70- .01
Sept. 6.5	55.70- .58	30.81 +.01	22.68 +.03	12.24 .00	48.11 +.02	60.13- .06	44.30 +.04	51.76+ .15
16.4	54.78 1.21	30.81 -0.02	22.69 -0.01	12.21 -0.06	48.10 -0.02	59.92 .36	44.31 -0.01	52.01 .32
26.4	53.28 1.81	30.77 .06	22.66 .05	12.12 .11	48.06 .06	59.41 .63	44.28 .05	52.41 .47
Oct. 6.4	51.16 2.37	30.70 .08	22.58 .08	12.00 .15	47.97 .10	58.66 .86	44.22 .08	52.95 .62
16.4	48.53-2.82	30.61 -0.10	22.50 -0.10	11.82 -0.18	47.85 -0.13	57.68-1.07	44.13 -0.10	53.63+ .76
26.3	45.51 3.18	30.50 .12	22.38 .12	11.63 .20	47.71 .15	56.49 1.26	44.02 .12	54.47 .89
Nov. 5.3	42.16 3.42	30.37 .13	22.26 .13	11.41 .23	47.54 .17	55.15 1.39	43.89 .13	55.41 1.00
15.3	38.66 3.51	30.24 .12	22.13 .14	11.16 .25	47.36 .18	53.71 1.46	43.76 .14	56.47 1.11
25.3	35.13 3.49	30.12 .22	21.99 .13	10.92 .24	47.18 .19	52.22 1.47	43.61 .15	57.64 1.18
Dec. 5.2	31.67-3.33	30.00 -0.11	21.87 -0.12	10.67 -0.24	46.99 -0.18	50.76-1.43	43.47 -0.14	58.83+1.19
15.2	28.46-3.06	29.90 -0.09	21.76 -0.10	10.44 -0.23	46.81 -0.17	49.36-1.35	43.34 -0.15	60.05+1.20
Mean Solar Date.	$\sigma$ Androm.	$\phi$ Aquarii.	$\tau$ Pegasi.	$\lambda$ Androm.	$\delta^1$ Aquarii.	$\delta$ Sculptoris.	$\gamma^1$ Octantis.	$\pi$ Piscium.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	48 13 22 57	96 36 23 9	66 49 23 15	44 5 23 32	108 50 23 39	118 41 23 43	172 35 23 46	96 16 24 0
July 28.6	20.30 +.25	9.43 +.22	42.03 +.23	41.20 +.29	1.64 +.26	43.81 +.28	19.89+1.57	13.57 +.26
Aug. 7.6	20.53 .20	9.64 .18	42.24 .20	41.47 .23	1.89 .22	44.06 .24	21.18 1.20	13.81 .23
17.6	20.70 .15	9.80 .14	42.43 .16	41.70 .20	2.08 .18	44.28 .20	22.28 .97	14.03 .20
27.5	20.83 .10	9.93 .11	42.56 .11	41.87 .15	2.25 .14	44.46 .15	23.12 .70	14.20 .16
Sept. 6.5	20.90 +.05	10.02 .07	42.65 .07	42.00 .10	2.37 .10	44.59 .11	23.69 .41	14.34 .12
16.5	20.91 .00	10.07 +.03	42.70 +.03	42.07 +.05	2.46 +.06	44.68 +.07	23.93+ .11	14.43 +.08
26.5	20.90 -0.04	10.08 -0.01	42.72 .00	42.10 +.01	2.50 +.02	44.72 +.02	23.87- .21	14.50 .04
Oct. 6.4	20.83 .09	10.05 .04	42.70 -0.04	42.08 -0.04	2.49 -0.02	44.73 -0.03	23.51 .52	14.52 +.01
16.4	20.73 .12	10.00 .07	42.65 .07	42.02 .08	2.46 .05	44.68 .08	22.86 .80	14.51 -0.02
26.4	20.60 .15	9.92 .09	42.56 .09	41.92 .12	2.40 .08	44.61 .09	21.91 1.07	14.48 .05
Nov. 5.3	20.44 -0.16	9.82 -0.10	42.46 -0.11	41.78 -0.15	2.31 -0.10	44.51 -0.11	20.72-1.29	14.42 -0.07
15.3	20.27 .18	9.71 .11	42.34 .12	41.63 .17	2.20 .11	44.39 .15	19.32 1.46	14.34 .09
25.3	20.08 .19	9.59 .12	42.21 .13	41.44 .19	2.08 .12	44.26 .14	17.80 1.57	14.24 .10
Dec. 5.3	19.89 .19	9.47 .12	42.08 .13	41.25 .19	1.96 .12	44.11 .15	16.17 1.64	14.14 .11
15.2	19.70 .18	9.36 .11	41.95 .12	41.05 .20	1.84 .12	43.97 .14	14.51 1.65	14.03 .11
25.2	19.52 -0.18	9.26 -0.09	41.83 -0.12	40.84 -0.21	1.71 -0.12	43.82 -0.14	12.87-1.60	13.92 -0.11
35.2	19.34 -0.17	9.18 -0.07	41.71 -0.11	40.64 -0.20	1.60 -0.10	43.69 -0.12	11.31-1.50	13.81 -0.10

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Jan. 1	18 48 24.66	25.36	-22 59 10.0	9.1	11.031	+12.76	+ 3 53.36	16 18.40	1 11.03	18 44 31.38
2	18 52 49.26	50.06	22 53 50.2	49.1	11.018	13.89	4 21.40	16 18.39	1 10.99	18 48 27.94
3	18 57 13.51	14.40	22 48 2.9	1.7	11.005	15.02	4 49.11	16 18.38	1 10.94	18 52 24.50
4	19 1 37.39	38.36	22 41 48.5	47.1	10.986	16.15	5 16.45	16 18.36	1 10.89	18 56 21.06
5	19 6 0.89	1.94	22 35 7.1	5.4	10.969	17.28	5 43.38	16 18.33	1 10.83	19 0 17.61
6	19 10 23.93	25.06	-22 27 58.7	56.8	10.951	+18.40	+ 6 9.87	16 18.30	1 10.77	19 4 14.17
7	19 14 46.52	47.73	22 20 23.6	21.5	10.931	19.51	6 35.91	16 18.27	1 10.71	19 8 10.73
8	19 19 8.62	9.90	22 12 22.3	19.9	10.910	20.60	7 1.46	16 18.23	1 10.64	19 12 7.29
9	19 23 30.21	31.55	22 3 54.7	52.1	10.888	21.69	7 26.49	16 18.19	1 10.56	19 16 3.85
10	19 27 51.24	52.67	21 54 61.3	58.3	10.865	22.76	7 50.97	16 18.15	1 10.48	19 20 0.40
11	19 32 11.70	13.19	-21 45 42.1	38.8	10.840	+23.82	+ 8 14.87	16 18.10	1 10.40	19 23 56.96
12	19 36 31.56	33.11	21 35 57.6	54.0	10.815	24.87	8 38.19	16 18.05	1 10.32	19 27 53.52
13	19 40 50.80	52.41	21 25 48.1	44.1	10.788	25.91	9 0.86	16 17.99	1 10.23	19 31 50.08
14	19 45 9.38	11.06	21 15 13.8	9.6	10.761	26.94	9 22.88	16 17.93	1 10.14	19 35 46.63
15	19 49 27.28	29.02	21 4 15.0	10.5	10.732	27.94	9 44.23	16 17.87	1 10.05	19 39 43.19
16	19 53 44.49	46.28	-20 52 52.2	47.4	10.702	+28.94	+10 4.88	16 17.80	1 9.96	19 43 39.75
17	19 58 0.97	2.84	20 41 5.5	0.3	10.672	29.93	10 24.82	16 17.73	1 9.86	19 47 36.30
18	20 2 16.74	18.65	20 28 55.4	49.9	10.641	30.90	10 44.02	16 17.65	1 9.76	19 51 32.86
19	20 6 31.75	33.70	20 16 22.3	16.4	10.609	31.85	11 2.47	16 17.57	1 9.66	19 55 29.42
20	20 10 45.99	47.99	20 3 26.2	20.1	10.577	32.80	11 20.15	16 17.48	1 9.56	19 59 25.98
21	20 15 59.46	61.49	-19 50 8.0	1.5	10.545	+33.72	+11 37.05	16 17.39	1 9.46	20 3 22.53
22	20 19 12.14	14.21	19 36 27.5	20.7	10.512	34.63	11 53.18	16 17.30	1 9.36	20 7 19.09
23	20 23 24.03	26.14	19 22 25.4	18.3	10.479	35.53	12 8.51	16 17.20	1 9.25	20 11 15.65
24	20 27 35.12	37.27	19 7 61.9	54.3	10.446	36.42	12 23.04	16 17.09	1 9.14	20 15 12.20
25	20 31 45.40	47.59	18 53 17.5	9.6	10.412	37.28	12 36.76	16 16.97	1 9.03	20 19 8.76
26	20 35 54.88	57.10	-18 38 12.4	4.3	10.379	+38.13	+12 49.68	16 16.85	1 8.92	20 23 5.32
27	20 40 3.55	5.79	18 22 47.0	38.5	10.345	38.97	13 1.79	16 16.72	1 8.80	20 27 1.87
28	20 44 11.41	13.68	18 6 61.8	52.9	10.311	39.79	13 13.07	16 16.59	1 8.69	20 30 58.43
29	20 48 18.46	20.76	17 50 56.9	47.7	10.277	40.60	13 23.57	16 16.46	1 8.58	20 34 54.98
30	20 52 24.71	27.02	17 34 33.0	23.5	10.243	41.39	13 33.26	16 16.32	1 8.47	20 38 51.54
31	20 56 30.15	32.49	-17 17 50.1	40.4	10.210	+42.16	+13 42.13	16 16.17	1 8.35	20 42 48.10
Feb. 1	21 0 34.79	37.13	17 0 48.9	39.0	10.177	42.92	13 50.20	16 16.02	1 8.24	20 46 44.65
2	21 4 38.61	40.97	16 43 29.8	19.6	10.143	43.67	13 57.47	16 15.86	1 8.12	20 50 41.21
3	21 8 41.64	44.01	16 25 53.0	42.5	10.110	44.39	14 3.94	16 15.70	1 8.01	20 54 37.76
4	21 12 43.88	46.25	16 7 58.9	48.3	10.076	45.10	14 9.61	16 15.53	1 7.89	20 58 34.32
5	21 16 45.31	47.70	-15 49 48.3	37.4	10.043	+45.79	+14 14.48	16 15.36	1 7.78	21 2 30.87
6	21 20 45.96	48.34	15 31 21.2	10.1	10.010	46.46	14 18.56	16 15.19	1 7.66	21 6 27.43
7	21 24 45.81	48.20	15 12 38.2	26.9	9.977	47.11	14 21.86	16 15.01	1 7.55	21 10 23.98
8	21 28 44.89	47.28	14 53 39.7	28.2	9.945	47.74	14 24.35	16 14.83	1 7.43	21 14 20.54
9	21 32 43.16	45.54	14 34 26.2	14.5	9.913	48.36	14 26.06	16 14.65	1 7.32	21 18 17.10
10	21 36 40.65	43.03	-14 14 58.1	46.2	9.880	+48.96	+14 27.00	16 14.47	1 7.21	21 22 13.65
11	21 40 37.37	39.74	13 55 15.8	3.8	9.847	49.54	14 27.16	16 14.29	1 7.10	21 26 10.20
12	21 44 33.32	35.69	13 35 19.8	7.7	9.815	50.11	14 26.54	16 14.10	1 6.99	21 30 6.76
13	21 48 28.50	30.85	13 14 70.6	58.3	9.784	50.65	14 25.18	16 13.91	1 6.89	21 34 3.31
14	21 52 22.93	25.27	12 54 48.5	36.2	9.753	51.18	14 23.03	16 13.72	1 6.78	21 37 59.87
15	21 56 16.61	18.93	-12 34 14.0	1.6	9.722	+51.68	+14 20.15	16 13.52	1 6.67	21 41 56.42
16	22 0 9.55	11.85	-12 13 27.6	15.1	9.691	+52.17	+14 16.52	16 13.32	1 6.57	21 45 52.98

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.19 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s		m s	h m s
Feb. 16	22 0 9.55	11.85	-12 13 27.6	15.1	9.691	+54.17	+14 16.52	16 13.32	1 6.57	21 45 52.98
17	22 4 1.75	4.04	11 52 29.5	17.0	9.661	58.65	14 12 17	16 13.12	1 6.47	21 49 49.53
18	22 7 53.25	55.51	11 31 20.3	7.8	9.631	53.10	14 7.10	16 12.92	1 6.37	21 53 46.09
19	22 11 44.04	46.28	11 9 60.4	47.8	9.602	53.54	14 1.34	16 12.71	1 6.27	21 57 42.64
20	22 15 34.14	36.37	10 48 30.1	17.5	9.574	53.96	13 54.88	16 12.50	1 6.18	22 1 39.20
21	22 19 23.58	25.78	-10 26 49.9	37.3	9.546	+54.37	+13 47.76	16 12.28	1 6.09	22 5 35.75
22	22 23 12.37	14.54	10 4 60.2	47.6	9.520	54.76	13 39.99	16 12.06	1 6.00	22 9 32.30
23	22 27 0.52	2.66	9 42 61.3	48.8	9.494	55.14	13 31.59	16 11.83	1 5.91	22 13 28.86
24	22 30 48.06	50.17	9 20 53.5	41.0	9.469	55.49	13 22.57	16 11.61	1 5.82	22 17 25.41
25	22 34 35.01	37.09	8 58 37.6	25.2	9.445	55.83	13 12.95	16 11.38	1 5.74	22 21 21.96
26	22 38 21.38	23.43	- 8 36 13.4	1.1	9.421	+56.15	+13 2.77	16 11.14	1 5.65	22 25 18.52
27	22 42 7.20	9.21	8 13 41.6	29.4	9.398	56.47	12 52.03	16 10.90	1 5.57	22 29 15.07
28	22 45 52.49	54.46	7 50 62.5	50.4	9.377	56.77	12 40.75	16 10.66	1 5.49	22 33 11.62
Mar. 1	22 49 37.26	39.20	7 28 16.6	4.6	9.356	57.05	12 28.98	16 10.41	1 5.42	22 37 8.18
2	22 53 21.55	23.46	7 5 24.1	12.3	9.336	57.31	12 16.70	16 10.16	1 5.35	22 41 4.73
3	22 57 5.36	7.24	- 6 42 25.5	13.9	9.316	+57.56	+12 3.97	16 9.91	1 5.28	22 45 1.28
4	23 0 48.71	50.55	6 19 21.2	9.7	9.297	57.79	11 50.78	16 9.65	1 5.22	22 48 57.84
5	23 4 31.67	33.47	5 56 11.4	0.1	9.280	58.01	11 37.17	16 9.39	1 5.16	22 52 54.39
6	23 8 14.20	15.96	5 32 56.7	45.7	9.264	58.21	11 23.14	16 9.13	1 5.10	22 56 50.94
7	23 11 56.34	58.05	5 9 37.5	26.6	9.248	58.39	11 8.72	16 8.87	1 5.04	23 0 47.50
8	23 15 38.10	39.78	- 4 46 14.1	3.4	9.233	+58.55	+10 53.93	16 8.61	1 4.98	23 4 44.05
9	23 19 19.51	21.14	4 22 47.0	36.5	9.218	58.70	10 38.79	16 8.35	1 4.92	23 8 40.60
10	23 23 0.57	2.16	3 59 16.5	6.3	9.204	58.83	10 23.30	16 8.09	1 4.87	23 12 37.16
11	23 26 41.31	42.85	3 35 43.1	33.1	9.191	58.94	10 7.48	16 7.82	1 4.82	23 16 33.71
12	23 30 21.73	23.24	3 11 67.1	57.3	9.178	59.03	9 51.37	16 7.56	1 4.78	23 20 30.26
13	23 34 1.87	3.33	- 2 48 29.1	19.6	9.167	+59.11	+ 9 34.95	16 7.29	1 4.74	23 24 26.81
14	23 37 41.74	43.16	2 24 49.2	40.0	9.156	59.18	9 18.26	16 7.03	1 4.70	23 28 23.37
15	23 41 21.34	22.71	2 0 68.1	59.2	9.145	59.23	9 1.31	16 6.77	1 4.66	23 32 19.92
16	23 45 0.70	2.03	1 37 26.1	17.4	9.135	59.26	8 44.12	16 6.51	1 4.63	23 36 16.47
17	23 48 39.84	41.12	1 13 43.3	34.9	9.126	59.28	8 26.72	16 6.24	1 4.61	23 40 13.02
18	23 52 18.78	20.02	- 0 49 60.4	52.3	9.119	+59.28	+ 8 9.10	16 5.98	1 4.59	23 44 9.58
19	23 55 57.54	58.73	0 26 17.7	9.9	9.112	59.27	7 51.31	16 5.71	1 4.57	23 48 6.13
20	23 59 36.12	37.27	- 0 2 35.5	28.0	9.105	59.24	7 33.34	16 5.44	1 4.55	23 52 2.68
21	0 3 14.57	15.67	+ 0 21 5.8	13.0	9.099	59.20	7 15.24	16 5.17	1 4.53	23 55 59.24
22	0 6 52.90	53.95	0 44 45.9	52.7	9.094	59.14	6 57.02	16 4.90	1 4.52	23 59 55.79
23	0 10 31.12	32.15	+ 1 8 24.4	31.0	9.091	+59.07	+ 6 38.70	16 4.63	1 4.51	0 3 52.34
24	0 14 9.27	10.23	1 32 1.1	7.4	9.089	58.98	6 20.30	16 4.36	1 4.50	0 7 48.90
25	0 17 47.37	48.28	1 55 35.5	41.5	9.087	58.88	6 1.84	16 4.09	1 4.49	0 11 45.45
26	0 21 25.43	26.29	2 19 7.4	13.1	9.086	58.76	5 43.35	16 3.81	1 4.49	0 15 42.00
27	0 25 3.49	4.33	2 42 36.4	41.8	9.086	58.63	5 24.86	16 3.53	1 4.49	0 19 38.55
28	0 28 41.57	42.34	+ 3 6 2.1	7.2	9.087	+58.50	+ 5 6.40	16 3.25	1 4.49	0 23 35.11
29	0 32 19.69	20.43	3 29 24.5	29.1	9.090	58.35	4 47.97	16 2.97	1 4.49	0 27 31.66
30	0 35 57.87	58.56	3 52 43.0	47.3	9.093	58.18	4 29.61	16 2.69	1 4.50	0 31 28.21
31	0 39 36.15	36.79	4 15 57.0	61.2	9.097	58.00	4 11.33	16 2.41	1 4.51	0 35 24.76
32	0 43 14.53	15.10	4 39 6.7	10.5	9.102	57.80	3 53.17	16 2.12	1 4.52	0 39 21.32
33	0 46 53.05	53.59	+ 5 2 11.4	14.9	9.108	+57.59	+ 3 35.14	16 1.84	1 4.54	0 43 17.87
34	0 50 31.71	32.21	+ 5 25 10.9	14.0	9.114	+57.36	+ 3 17.25	16 1.56	1 4.56	0 47 14.42

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	"	m s	h m s
Apr. 1	0 43 14.53	15.10	+ 4 39 6.7	10.5	9.102	+57.80	+3 53.17	16 2.12	I 4.52	0 39 21.32
2	0 46 53.05	53.59	5 2 11.4	14.9	9.108	57.59	3 35.14	16 1.84	I 4.54	0 43 17.87
3	0 50 31.71	32.21	5 25 10.9	14.0	9.114	57.36	3 17.25	16 1.56	I 4.56	0 47 14.42
4	0 54 10.54	10.99	5 48 4.8	7.7	9.122	57.12	2 59.52	16 1.28	I 4.59	0 51 10.98
5	0 57 49.55	49.96	6 10 52.7	55.3	9.130	56.86	2 42.00	16 1.00	I 4.62	0 55 7.53
6	1 1 28.78	29.14	+ 6 33 34.3	36.7	9.139	+56.59	+2 24.67	16 0.72	I 4.65	0 59 4.08
7	1 5 8.22	8.53	6 56 9.4	11.3	9.148	56.31	2 7.56	16 0.44	I 4.68	1 3 0.64
8	1 8 47.90	48.18	7 18 37.3	39.0	9.158	56.01	1 50.69	16 0.16	I 4.71	1 6 57.19
9	1 12 27.82	28.06	7 40 57.8	59.2	9.169	55.69	1 34.07	15 59.88	I 4.75	1 10 53.74
10	1 16 8.02	8.21	8 3 10.5	11.7	9.181	55.36	1 17.70	15 59.61	I 4.79	1 14 50.30
11	1 19 48.49	48.64	+ 8 25 15.1	16.0	9.193	+55.02	+1 1.63	15 59.34	I 4.83	1 18 46.85
12	1 23 29.24	29.36	8 47 11.2	11.8	9.205	54.66	0 45.83	15 59.07	I 4.87	1 22 43.40
13	1 27 10.31	10.38	9 8 58.5	58.9	9.218	54.28	0 30.35	15 58.80	I 4.92	1 26 39.96
14	1 30 51.69	51.72	9 30 36.6	36.8	9.231	53.89	0 15.16	15 58.54	I 4.97	1 30 36.51
15	1 34 33.39	33.39	9 52 5.2	5.1	9.245	53.48	+0 0.32	15 58.28	I 5.02	1 34 33.06
16	1 38 15.44	15.40	+10 13 23.9	23.6	9.259	+53.06	-0 14.17	15 58.02	I 5.08	1 38 29.62
17	1 41 57.84	57.76	10 34 32.2	31.8	9.274	52.64	0 28.32	15 57.76	I 5.13	1 42 26.17
18	1 45 40.60	40.49	10 55 30.1	29.5	9.290	52.19	0 42.12	15 57.50	I 5.19	1 46 22.72
19	1 49 23.75	23.61	11 16 17.2	16.3	9.307	51.73	0 55.53	15 57.25	I 5.24	1 50 19.28
20	1 53 7.29	7.11	11 36 53.1	52.0	9.324	51.26	1 8.53	15 56.99	I 5.29	1 54 15.83
21	1 56 51.24	51.04	+11 57 17.3	16.3	9.341	+50.77	-1 21.12	15 56.74	I 5.34	1 58 12.39
22	2 0 35.63	35.39	12 17 29.9	28.6	9.359	50.27	1 33.29	15 56.49	I 5.40	2 2 8.94
23	2 4 20.47	20.19	12 37 30.4	29.0	9.377	49.76	1 45.02	15 56.24	I 5.47	2 6 5.50
24	2 8 5.74	5.44	12 57 18.4	16.8	9.396	49.24	1 56.29	15 55.99	I 5.55	2 10 2.05
25	2 11 51.51	51.17	13 16 53.8	52.0	9.416	48.70	2 7.09	15 55.74	I 5.63	2 13 58.60
26	2 15 37.74	35.39	+13 36 16.0	14.1	9.437	+48.15	-2 17.40	15 55.49	I 5.71	2 17 55.16
27	2 19 24.49	24.11	13 55 25.0	23.0	9.459	47.59	2 27.20	15 55.24	I 5.79	2 21 51.71
28	2 23 11.75	11.35	14 14 20.2	18.2	9.481	47.01	2 36.50	15 54.99	I 5.86	2 25 48.27
29	2 26 59.55	59.11	14 32 61.5	59.4	9.503	46.42	2 45.26	15 54.74	I 5.94	2 29 44.82
30	2 30 47.87	47.41	14 51 28.6	26.3	9.525	45.82	2 53.49	15 54.50	I 6.01	2 33 41.38
May 1	2 34 36.75	36.27	+15 9 41.0	38.7	9.548	+45.21	-3 1.16	15 54.25	I 6.09	2 37 37.93
2	2 38 26.19	25.69	15 27 38.4	36.1	9.571	44.58	3 8.28	15 54.01	I 6.17	2 41 34.49
3	2 42 16.19	15.68	15 45 20.6	18.2	9.595	43.93	3 14.84	15 53.77	I 6.25	2 45 31.04
4	2 46 6.76	6.23	16 2 47.4	44.9	9.619	43.27	3 20.81	15 53.53	I 6.33	2 49 27.60
5	2 49 57.92	57.36	16 19 58.2	55.7	9.643	42.61	3 26.22	15 53.30	I 6.41	2 53 24.16
6	2 53 49.64	49.08	+16 36 52.7	50.2	9.667	+41.93	-3 31.06	15 53.07	I 6.49	2 57 20.71
7	2 57 41.94	41.37	16 53 30.6	28.1	9.691	41.23	3 35.30	15 52.84	I 6.57	3 1 17.27
8	3 1 34.83	34.25	17 9 51.8	49.3	9.715	40.52	3 38.98	15 52.62	I 6.65	3 5 13.82
9	3 5 28.31	27.70	17 25 55.9	53.4	9.740	39.80	3 42.07	15 52.40	I 6.73	3 9 10.38
10	3 9 22.34	21.73	17 41 42.3	39.9	9.764	39.07	3 44.58	15 52.19	I 6.81	3 13 6.93
11	3 13 16.95	16.34	+17 57 11.0	8.5	9.787	+38.32	-3 46.53	15 51.98	I 6.89	3 17 3.49
12	3 17 12.13	11.52	18 12 21.6	19.2	9.811	37.56	3 47.91	15 51.78	I 6.98	3 21 0.04
13	3 21 7.88	7.26	18 27 13.9	11.5	9.834	36.78	3 48.72	15 51.58	I 7.06	3 24 56.60
14	3 25 4.18	3.56	18 41 47.5	45.1	9.858	36.00	3 48.97	15 51.38	I 7.14	3 28 53.16
15	3 29 1.05	0.42	18 55 62.0	59.7	9.881	35.21	3 48.67	15 51.18	I 7.22	3 32 49.71
16	3 32 58.46	57.83	+19 9 57.4	55.2	9.904	+34.40	-3 47.81	15 50.99	I 7.31	3 36 46.27
17	3 36 56.41	42.78	+19 23 33.3	31.2	9.926	+33.58	-3 46.42	15 50.80	I 7.39	3 40 42.82

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.9 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	"	m s	h m s
May 17	3 36 56.41	42.78	+19 23 33.3	31.2	9.926	+33.58	-3 46.42	15 50.80	I 7.39	3 40 42.82
18	3 40 54.91	54.29	19 36 49.4	47.3	9.949	32.75	3 44.48	15 50.62	I 7.47	3 44 39.38
19	3 44 53.93	53.31	19 49 45.5	43.5	9.971	31.92	3 42.01	15 50.44	I 7.54	3 48 35.94
20	3 48 53.50	52.89	20 2 21.5	19.5	9.993	31.07	3 39.01	15 50.26	I 7.62	3 52 32.50
21	3 52 53.58	52.98	20 14 36.8	34.9	10.015	30.20	3 35.48	15 50.09	I 7.70	3 56 29.05
22	3 56 54.19	53.60	+20 26 31.5	29.7	10.036	+29.33	-3 31.43	15 49.92	I 7.77	4 0 25.61
23	4 0 55.31	54.73	20 38 5.1	3.4	10.057	28.46	3 26.86	15 49.75	I 7.84	4 4 22.17
24	4 4 56.95	56.38	20 49 17.7	16.1	10.078	27.58	3 21.78	15 49.58	I 7.91	4 8 18.72
25	4 8 59.09	58.54	21 0 8.8	7.2	10.099	26.68	3 16.20	15 49.42	I 7.98	4 12 15.28
26	4 13 1.73	1.20	21 10 38.1	36.7	10.120	25.77	3 10.11	15 49.26	I 8.05	4 16 11.84
27	4 17 4.86	4.34	+21 20 45.7	44.3	10.140	+24.85	-3 3.55	15 49.10	I 8.12	4 20 8.39
28	4 21 8.47	7.97	21 30 31.2	29.9	10.160	23.93	2 56.49	15 48.94	I 8.18	4 24 4.95
29	4 25 12.55	12.07	21 39 54.3	53.2	10.180	23.00	2 48.97	15 48.78	I 8.24	4 28 1.51
30	4 29 17.10	16.64	21 48 55.0	53.9	10.199	22.06	2 40.98	15 48.63	I 8.30	4 31 58.06
31	4 33 22.09	21.66	21 57 32.9	32.0	10.217	21.11	2 32.55	15 48.48	I 8.36	4 35 54.62
June 1	4 37 27.52	27.11	+22 5 48.2	47.3	10.234	+20.15	-2 23.68	15 48.34	I 8.42	4 39 51.18
2	4 41 33.36	32.98	22 13 40.2	39.4	10.251	19.18	2 14.40	15 48.20	I 8.47	4 43 47.74
3	4 45 39.61	39.25	22 21 9.0	8.3	10.268	18.21	2 4.70	15 48.06	I 8.52	4 47 44.30
4	4 49 46.24	45.90	22 28 14.4	13.8	10.283	17.23	1 54.64	15 47.93	I 8.57	4 51 40.85
5	4 53 53.22	52.91	22 34 56.2	55.7	10.298	16.25	1 44.21	15 47.80	I 8.62	4 55 37.41
6	4 58 0.53	0.26	+22 41 14.3	13.9	10.312	+15.26	-1 33.45	15 47.68	I 8.66	4 59 33.97
7	5 2 8.16	7.93	22 47 8.5	8.1	10.324	14.26	1 22.37	15 47.57	I 8.70	5 3 30.53
8	5 6 16.09	15.89	22 52 38.7	38.4	10.335	13.25	1 10.99	15 47.46	I 8.74	5 7 27.08
9	5 10 24.29	24.12	22 57 44.8	44.6	10.346	12.24	0 59.36	15 47.36	I 8.78	5 11 23.64
10	5 14 32.72	32.58	23 2 26.7	26.5	10.356	11.23	0 47.49	15 47.26	I 8.81	5 15 20.20
11	5 18 41.37	41.26	+23 6 44.2	44.1	10.365	+10.22	-0 35.40	15 47.16	I 8.84	5 19 16.76
12	5 22 50.20	50.13	23 10 37.3	37.3	10.372	9.20	0 23.12	15 47.07	I 8.87	5 23 13.31
13	5 26 59.21	59.17	23 14 5.9	5.9	10.378	8.18	-0 10.67	15 46.98	I 8.89	5 27 9.87
14	5 31 8.34	8.34	23 17 10.1	10.1	10.383	7.16	+0 1.90	15 46.91	I 8.91	5 31 6.43
15	5 35 17.59	17.63	23 19 49.6	49.6	10.388	6.13	0 14.60	15 46.84	I 8.93	5 35 2.99
16	5 39 26.94	27.02	+23 22 4.3	4.3	10.391	+5.10	+0 27.39	15 46.77	I 8.94	5 38 59.55
17	5 43 36.36	36.47	23 23 54.4	54.4	10.393	4.07	0 40.25	15 46.70	I 8.95	5 42 56.10
18	5 47 45.82	45.97	23 25 19.8	19.8	10.394	3.04	0 53.16	15 46.64	I 8.96	5 46 52.66
19	5 51 55.31	55.50	23 26 20.4	20.4	10.395	2.01	1 6.10	15 46.58	I 8.97	5 50 49.22
20	5 56 4.80	5.03	23 26 56.4	56.4	10.395	+0.98	1 19.03	15 46.52	I 8.97	5 54 45.78
21	6 0 14.28	14.54	+23 27 7.5	7.5	10.394	-0.05	+1 31.95	15 46.47	I 8.97	5 58 42.34
22	6 4 23.72	24.02	23 26 53.8	53.7	10.392	1.08	1 44.84	15 46.42	I 8.96	6 2 38.89
23	6 8 33.10	33.45	23 26 15.2	15.1	10.389	2.12	1 57.67	15 46.38	I 8.95	6 6 35.45
24	6 12 42.41	42.80	23 25 12.0	11.9	10.386	3.15	2 10.42	15 46.33	I 8.94	6 10 32.01
25	6 16 51.63	52.03	23 23 44.2	44.0	10.382	4.18	2 23.08	15 46.29	I 8.93	6 14 28.57
26	6 21 0.73	1.18	+23 21 51.5	51.3	10.377	-5.21	+2 35.63	15 46.25	I 8.91	6 18 25.12
27	6 25 9.70	10.19	23 19 34.2	34.0	10.371	6.24	2 48.04	15 46.22	I 8.89	6 22 21.68
28	6 29 18.52	19.03	23 16 52.3	52.0	10.364	7.26	3 0.30	15 46.20	I 8.86	6 26 18.24
29	6 33 27.16	27.72	23 13 46.0	45.5	10.356	8.28	3 12.39	15 46.18	I 8.83	6 30 14.80
30	6 37 35.60	36.20	23 10 15.0	14.5	10.347	9.30	3 24.28	15 46.16	I 8.80	6 34 11.36
31	6 41 43.85	44.47	+23 6 19.9	19.3	10.338	-10.31	+3 35.96	15 46.14	I 8.77	6 38 7.91
32	6 45 51.84	52.49	+23 1 60.4	59.7	10.328	-11.32	+3 47.40	15 46.13	I 8.73	6 42 4.47

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0°.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	"	"	m s	"	m s	h m s
July 1	6 41 43.85	44.47	+23 6 19.9	19.3	10.338	-20.31	+3 35.96	15 46.14	1 8.77	6 38 7.91
2	6 45 51.84	52.49	23 1 60.4	59.7	10.328	11.32	3 47.40	15 46.13	1 8.73	6 42 4.47
3	6 49 59.57	60.26	22 57 16.6	15.8	10.316	12.32	3 58.57	15 46.12	1 8.69	6 46 1.03
4	6 54 7.03	7.73	22 52 8.9	8.0	10.304	13.32	4 9.47	15 46.12	1 8.65	6 49 57.59
5	6 58 14.17	14.90	22 46 37.2	36.3	10.291	14.31	4 20.05	15 46.12	1 8.60	6 53 54.14
6	7 2 20.98	21.75	+22 40 41.8	40.7	10.277	-15.30	+4 30.30	15 46.13	1 8.55	6 57 50.70
7	7 6 27.44	28.23	22 34 22.6	21.4	10.262	16.28	4 40.21	15 46.14	1 8.50	7 1 47.26
8	7 10 33.52	34.34	22 27 40.1	38.8	10.245	17.26	4 49.73	15 46.16	1 8.45	7 5 43.82
9	7 14 39.20	40.04	22 20 34.2	32.8	10.228	18.23	4 58.86	15 46.19	1 8.39	7 9 40.38
10	7 18 44.47	45.33	22 13 5.4	3.8	10.210	19.18	5 7.55	15 46.23	1 8.33	7 13 36.93
11	7 22 49.29	50.17	+22 5 13.5	11.8	10.192	-20.13	+5 15.82	15 46.27	1 8.27	7 17 33.49
12	7 26 53.65	54.57	21 56 59.0	57.1	10.172	21.07	5 23.63	15 46.31	1 8.21	7 21 30.05
13	7 30 57.54	58.46	21 48 21.9	19.9	10.152	22.01	5 30.96	15 46.36	1 8.15	7 25 26.60
14	7 35 0.92	1.88	21 39 22.4	20.4	10.131	22.94	5 37.79	15 46.41	1 8.08	7 29 23.16
15	7 39 3.81	4.77	21 29 61.0	58.8	10.109	23.86	5 44.11	15 46.47	1 8.01	7 33 19.72
16	7 43 6.17	7.15	+21 20 17.5	15.2	10.087	-24.76	+5 49.92	15 46.53	1 7.94	7 37 16.28
17	7 47 8.00	8.99	21 10 12.5	10.1	10.065	25.66	5 55.18	15 46.60	1 7.87	7 41 12.83
18	7 51 9.28	10.28	20 59 46.0	43.4	10.042	26.55	5 59.91	15 46.67	1 7.79	7 45 9.39
19	7 55 10.01	11.02	20 48 58.3	55.6	10.019	27.43	6 4.08	15 46.75	1 7.71	7 49 5.95
20	7 59 10.18	11.20	20 37 49.6	46.8	9.996	28.30	6 7.69	15 46.83	1 7.63	7 53 2.50
21	8 3 9.79	10.81	+20 26 20.0	17.0	9.972	-29.16	+6 10.74	15 46.91	1 7.55	7 56 59.06
22	8 7 8.83	9.86	20 14 29.9	26.8	9.948	30.01	6 13.21	15 46.99	1 7.47	8 0 55.62
23	8 11 7.28	8.32	20 2 19.5	16.3	9.924	30.85	6 15.12	15 47.07	1 7.39	8 4 52.17
24	8 15 5.17	6.21	19 49 48.9	45.7	9.900	31.69	6 16.45	15 47.16	1 7.31	8 8 48.73
25	8 19 2.49	3.53	19 36 58.6	55.3	9.876	32.51	6 17.20	15 47.26	1 7.22	8 12 45.29
26	8 22 59.21	60.25	+19 23 48.7	45.3	9.852	-33.32	+6 17.37	15 47.35	1 7.14	8 16 41.84
27	8 26 55.37	56.39	19 10 19.3	15.8	9.828	34.12	6 16.97	15 47.45	1 7.05	8 20 38.40
28	8 30 50.93	51.96	18 56 30.8	27.3	9.804	34.92	6 15.97	15 47.55	1 6.97	8 24 34.96
29	8 34 45.92	46.94	18 42 23.6	20.0	9.779	35.70	6 14.39	15 47.66	1 6.88	8 28 31.51
30	8 38 40.31	41.32	18 27 57.8	54.1	9.755	36.46	6 12.23	15 47.77	1 6.80	8 32 28.07
31	8 42 34.13	35.12	+18 13 13.8	10.1	9.730	-37.21	+6 9.48	15 47.89	1 6.71	8 36 24.62
Aug. 1	8 46 27.35	28.33	17 58 11.7	7.9	9.706	37.96	6 6.15	15 48.01	1 6.63	8 40 21.18
2	8 50 19.98	20.96	17 42 52.0	48.2	9.681	38.69	6 2.23	15 48.13	1 6.54	8 44 17.74
3	8 54 12.02	12.98	17 27 14.9	11.0	9.656	39.40	5 57.71	15 48.26	1 6.45	8 48 14.29
4	8 58 3.47	4.42	17 11 20.8	16.9	9.631	40.10	5 52.61	15 48.39	1 6.36	8 52 10.85
5	9 1 54.34	55.26	+16 55 9.8	5.9	9.607	-40.80	+5 46.91	15 48.53	1 6.27	8 56 7.40
6	9 5 44.60	45.51	16 38 42.4	38.6	9.582	41.48	5 40.62	15 48.67	1 6.19	9 0 3.96
7	9 9 34.28	35.16	16 21 58.9	55.1	9.558	42.14	5 33.73	15 48.82	1 6.10	9 4 0.51
8	9 13 23.36	24.22	16 4 59.7	55.9	9.533	42.79	5 26.26	15 48.97	1 6.02	9 7 57.07
9	9 17 11.86	12.69	15 47 45.0	41.2	9.509	43.42	5 18.19	15 49.13	1 5.93	9 11 53.62
10	9 20 59.76	60.58	+15 30 15.1	11.4	9.484	-44.04	+5 9.54	15 49.30	1 5.85	9 15 50.18
11	9 24 47.08	47.87	15 12 30.5	26.8	9.460	44.66	5 0.31	15 49.47	1 5.77	9 19 46.74
12	9 28 33.83	34.58	14 54 31.3	27.7	9.436	45.26	4 50.49	15 49.64	1 5.69	9 23 43.29
13	9 32 19.99	20.73	14 36 17.8	14.2	9.412	45.84	4 40.11	15 49.81	1 5.61	9 27 39.84
14	9 36 5.60	6.30	14 17 50.6	47.1	9.389	46.41	4 29.16	15 49.99	1 5.53	9 31 36.40
15	9 39 50.65	51.32	+13 59 9.7	6.4	9.366	-46.98	+4 17.65	15 50.17	1 5.46	9 35 32.96
16	9 43 35.16	35.79	+13 40 15.7	12.5	9.343	-47.53	+4 5.62	15 50.36	1 5.38	9 39 29.51

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.19 from the sidereal interval.



## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	"	m s	h m s
Aug. 16	9 43 35.16	35.79	+13 40 15.7	12.5	9.343	-47.53	+ 4 5.62	15 50.36	I 5.38	9 39 29.51
17	9 47 19.13	19.74	13 21 8.7	5.6	9.322	48.05	3 53.04	15 50.55	I 5.31	9 43 26.06
18	9 51 2.59	3.16	13 1 49.0	46.0	9.301	48.57	3 39.94	15 50.74	I 5.24	9 47 22.62
19	9 54 45.54	46.06	12 42 16.9	14.2	9.280	49.08	3 26.34	15 50.93	I 5.17	9 51 19.17
20	9 58 28.00	28.49	12 22 32.8	30.2	9.250	49.58	3 12.25	15 51.13	I 5.10	9 55 15.73
21	10 2 9.98	10.44	+12 2 36.9	34.4	9.240	-50.07	+ 2 57.68	15 51.32	I 5.03	9 59 12.28
22	10 5 51.51	51.93	11 42 29.5	27.3	9.221	50.54	2 42.65	15 51.52	I 4.96	10 3 8.84
23	10 9 32.59	32.97	11 22 10.9	8.9	9.203	51.00	2 27.19	15 51.72	I 4.90	10 7 5.39
24	10 13 13.26	13.60	11 1 41.5	39.6	9.186	51.44	2 11.28	15 51.93	I 4.84	10 11 1.94
25	10 16 53.51	53.80	10 40 61.5	59.8	9.170	51.88	1 54.99	15 52.13	I 4.78	10 14 58.50
26	10 20 33.38	33.63	+10 20 11.1	9.7	9.154	-52.31	+ 1 38.30	15 52.34	I 4.72	10 18 55.05
27	10 24 12.86	13.07	9 59 10.8	9.6	9.138	52.72	1 21.25	15 52.55	I 4.66	10 22 51.60
28	10 27 52.00	52.17	9 37 60.8	59.9	9.123	53.11	1 3.84	15 52.76	I 4.60	10 26 48.16
29	10 31 30.79	30.91	9 16 41.5	40.9	9.109	53.49	0 46.07	15 52.98	I 4.55	10 30 44.71
30	10 35 9.26	9.34	8 55 13.2	12.8	9.096	53.86	0 28.00	15 53.20	I 4.50	10 34 41.26
31	10 38 47.43	47.45	+ 8 33 36.2	36.2	9.084	-54.21	+ 0 9.60	15 53.42	I 4.45	10 38 37.82
Sept. 1	10 42 25.29	25.27	8 11 51.0	51.2	9.072	54.55	- 0 9.08	15 53.65	I 4.41	10 42 34.37
2	10 46 2.87	2.79	7 49 57.7	58.2	9.061	54.88	0 28.05	15 53.88	I 4.37	10 46 30.93
3	10 49 40.19	40.07	7 27 56.8	57.5	9.050	55.19	0 47.28	15 54.11	I 4.33	10 50 27.48
4	10 53 17.26	17.09	7 5 48.5	49.6	9.040	55.49	1 6.76	15 54.34	I 4.29	10 54 24.03
5	10 56 54.08	53.87	+ 6 43 33.4	34.7	9.030	-55.77	- 1 26.48	15 54.58	I 4.25	10 58 20.58
6	11 0 30.68	30.42	6 21 11.7	13.3	9.021	56.04	1 46.42	15 54.82	I 4.22	11 2 17.14
7	11 4 7.08	6.77	5 58 43.7	45.8	9.012	56.29	2 6.58	15 55.07	I 4.19	11 6 13.69
8	11 7 43.28	42.92	5 36 9.8	12.1	9.005	56.52	2 26.93	15 55.32	I 4.17	11 10 10.24
9	11 11 19.30	18.89	5 13 30.4	33.1	8.998	56.74	2 47.45	15 55.57	I 4.15	11 14 6.80
10	11 14 55.17	54.70	+ 4 50 45.8	48.7	8.992	-56.95	- 3 8.14	15 55.83	I 4.13	11 18 3.35
11	11 18 30.87	30.36	4 27 56.2	59.5	8.986	57.16	3 28.97	15 56.09	I 4.11	11 21 59.90
12	11 22 6.47	5.90	4 5 2.2	5.8	8.981	57.34	3 49.92	15 56.35	I 4.09	11 25 56.46
13	11 25 41.95	41.33	3 42 3.9	7.9	8.976	57.50	4 11.00	15 56.62	I 4.08	11 29 53.01
14	11 29 17.34	16.67	3 19 1.7	6.1	8.973	57.66	4 32.15	15 56.88	I 4.07	11 33 49.56
15	11 32 52.67	51.94	+ 2 55 55.9	60.6	8.971	-57.81	- 4 53.37	15 57.14	I 4.06	11 37 46.12
16	11 36 27.95	27.17	2 32 46.9	51.9	8.970	57.94	5 14.63	15 57.41	I 4.06	11 41 42.67
17	11 40 3.21	2.37	2 9 34.9	40.3	8.969	58.05	5 35.93	15 57.68	I 4.06	11 45 39.22
18	11 43 38.46	37.58	1 46 20.2	26.0	8.970	58.15	5 57.22	15 57.94	I 4.06	11 49 35.77
19	11 47 13.74	12.80	1 23 3.2	9.4	8.971	58.25	6 18.49	15 58.21	I 4.07	11 53 32.33
20	11 50 49.07	48.08	+ 0 59 44.2	50.7	8.974	-58.33	- 6 39.71	15 58.47	I 4.08	11 57 28.88
21	11 54 24.47	23.43	0 36 23.5	30.3	8.977	58.39	7 0.86	15 58.74	I 4.09	12 1 25.43
22	11 57 59.98	58.88	+ 0 13 1.4	8.6	8.982	58.44	7 21.90	15 59.01	I 4.11	12 5 21.98
23	12 1 35.59	34.43	- 0 10 21.7	14.2	8.987	58.48	7 42.83	15 59.28	I 4.13	12 9 18.54
24	12 5 11.36	10.15	0 33 45.7	37.8	8.993	58.50	8 3.62	15 59.54	I 4.15	12 13 15.09
25	12 8 47.27	46.01	- 0 57 9.9	1.8	9.001	-58.51	- 8 24.25	15 59.81	I 4.18	12 17 11.64
26	12 12 23.38	22.07	1 20 34.3	25.8	9.009	58.51	8 44.69	16 0.07	I 4.21	12 21 8.19
27	12 15 59.71	58.34	1 43 58.5	49.6	9.018	58.49	9 4.91	16 0.34	I 4.24	12 25 4.75
28	12 19 36.26	34.85	2 7 21.9	12.7	9.028	58.46	9 24.91	16 0.61	I 4.27	12 29 1.30
29	12 23 13.07	11.61	2 30 44.4	34.8	9.040	58.41	9 44.66	16 0.88	I 4.30	12 32 57.85
30	12 26 50.15	48.62	- 2 53 65.5	55.8	9.052	-58.34	-10 4.13	16 1.15	I 4.34	12 36 54.40
31	12 30 27.50	25.93	- 3 17 24.9	14.8	9.064	-58.21	-10 23.31	16 1.43	I 4.38	12 40 50.96

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Oct. 1	12 30 27.50	25.93	- 3 17 24.9	14.8	9.064	-58.26	-10 23.31	16 1.43	I 4.38	12 40 50.96
2	12 34 5.18	3.55	3 40 42.1	31.8	9.077	58.16	10 42.20	16 1.70	I 4.42	12 44 47.51
3	12 37 43.16	41.50	4 3 56.9	46.2	9.090	58.05	11 0.75	16 1.97	I 4.47	12 48 44.06
4	12 41 21.51	19.79	4 26 68.8	57.9	9.104	57.93	11 18.97	16 2.25	I 4.52	12 52 40.62
5	12 44 60.20	58.43	4 50 17.4	6.2	9.119	57.79	11 36.83	16 2.53	I 4.57	12 56 37.17
6	12 48 39.26	37.44	- 5 13 22.4	10.9	9.136	-57.63	-11 54.32	16 2.81	I 4.63	13 0 33.72
7	12 52 18.71	16.85	5 36 23.3	11.7	9.153	57.45	12 11.43	16 3.09	I 4.69	13 4 30.27
8	12 55 58.56	56.65	5 59 19.9	8.0	9.170	57.26	12 28.13	16 3.37	I 4.75	13 8 26.83
9	12 59 38.83	36.89	6 21 71.7	59.6	9.187	57.05	12 44.41	16 3.66	I 4.81	13 12 23.38
10	13 3 19.55	17.56	6 44 58.4	46.0	9.206	56.83	13 0.24	16 3.94	I 4.88	13 16 19.93
11	13 6 60.72	58.68	- 7 7 39.4	26.8	9.225	-56.59	-13 15.62	16 4.22	I 4.95	13 20 16.49
12	13 10 42.37	40.28	7 30 14.5	1.8	9.245	56.34	13 30.53	16 4.51	I 5.03	13 24 13.04
13	13 14 24.50	22.38	7 52 43.5	30.6	9.267	56.07	13 44.97	16 4.79	I 5.11	13 28 9.59
14	13 18 7.15	4.98	8 14 65.7	52.8	9.289	55.78	13 58.87	16 5.07	I 5.19	13 32 6.14
15	13 21 50.32	48.11	8 37 21.0	7.8	9.311	55.48	14 12.25	16 5.35	I 5.27	13 36 2.70
16	13 25 34.05	31.81	- 8 59 29.0	15.6	9.334	-55.17	-14 25.08	16 5.63	I 5.35	13 39 59.25
17	13 29 18.36	16.07	9 21 29.0	15.7	9.358	54.84	14 37.33	16 5.90	I 5.44	13 43 55.81
18	13 33 3.25	0.93	9 43 21.2	7.7	9.383	54.49	14 49.00	16 6.18	I 5.53	13 47 52.36
19	13 36 48.75	46.40	10 4 64.9	51.3	9.410	54.13	15 0.05	16 6.45	I 5.62	13 51 48.91
20	13 40 34.89	32.50	10 26 39.6	26.0	9.437	53.75	15 10.47	16 6.72	I 5.71	13 55 45.47
21	13 44 21.68	19.26	-10 47 65.2	51.5	9.464	-53.36	-15 20.24	16 6.99	I 5.80	13 59 42.02
22	13 48 9.14	6.69	11 9 21.2	7.6	9.492	52.96	15 29.34	16 7.26	I 5.90	14 3 38.57
23	13 51 57.29	54.82	11 30 27.2	13.5	9.521	52.54	15 37.75	16 7.52	I 6.00	14 7 35.13
24	13 55 46.15	43.65	11 51 22.8	9.2	9.551	52.10	15 45.45	16 7.77	I 6.10	14 11 31.68
25	13 59 35.75	33.21	12 11 67.8	54.2	9.581	51.64	15 52.41	16 8.03	I 6.20	14 15 28.24
26	14 3 26.08	23.51	-12 32 41.6	27.9	9.613	-51.16	-15 58.65	16 8.28	I 6.30	14 19 24.79
27	14 7 17.16	14.58	12 52 63.7	50.2	9.645	50.67	16 4.13	16 8.54	I 6.41	14 23 21.34
28	14 11 9.02	6.41	13 13 13.9	0.4	9.677	50.16	16 8.84	16 8.79	I 6.52	14 27 17.90
29	14 14 61.64	59.02	13 32 71.7	58.3	9.709	49.64	16 12.77	16 9.04	I 6.63	14 31 14.45
30	14 18 55.06	52.43	13 52 56.7	43.4	9.742	49.10	16 15.91	16 9.29	I 6.74	14 35 11.01
31	14 22 49.29	46.62	-14 12 28.4	15.2	9.776	-48.51	-16 18.26	16 9.54	I 6.85	14 39 7.56
Nov. 1	14 26 44.31	41.64	14 31 46.5	33.5	9.809	47.9	16 19.81	16 9.79	I 6.96	14 43 4.12
2	14 30 40.13	37.44	14 50 50.5	37.7	9.843	47.35	16 20.53	16 10.03	I 7.08	14 47 0.67
3	14 34 36.77	34.08	15 9 40.0	27.3	9.877	46.71	16 20.46	16 10.28	I 7.20	14 50 57.22
4	14 38 34.23	31.53	15 28 14.5	2.0	9.911	46.11	16 19.56	16 10.52	I 7.31	14 54 53.78
5	14 42 32.49	29.79	-15 46 33.7	21.4	9.945	-45.46	-16 17.85	16 10.77	I 7.43	14 58 50.34
6	14 46 31.61	28.90	16 4 37.1	25.1	9.979	44.80	16 15.32	16 11.01	I 7.55	15 2 46.89
7	14 50 31.53	28.83	16 22 24.4	12.5	10.014	44.12	16 11.95	16 11.24	I 7.67	15 6 43.44
8	14 54 32.29	29.59	16 39 55.0	43.4	10.048	43.42	16 7.76	16 11.49	I 7.79	15 10 40.00
9	14 58 33.87	31.17	16 56 68.8	57.3	10.083	42.70	16 2.76	16 11.73	I 7.91	15 14 36.56
10	15 2 36.27	33.57	-17 13 65.0	53.8	10.118	-41.97	-15 56.92	16 11.96	I 8.03	15 18 33.11
11	15 6 39.50	36.82	17 30 43.5	32.6	10.152	41.22	15 50.26	16 12.20	I 8.15	15 22 29.67
12	15 10 43.56	40.89	17 46 63.9	53.2	10.187	40.46	15 42.76	16 12.43	I 8.27	15 26 26.22
13	15 14 48.46	45.80	18 2 65.7	55.3	10.221	39.68	15 34.43	16 12.65	I 8.39	15 30 22.78
14	15 18 54.18	51.54	18 18 48.5	38.4	10.256	38.88	15 25.26	16 12.87	I 8.51	15 34 19.34
15	15 22 60.73	58.11	-18 34 11.9	2.2	10.290	-38.07	-15 15.27	16 13.08	I 8.62	15 38 15.89
16	15 27 8.13	5.54	-18 49 15.7	6.3	10.325	-37.24	-15 4.44	16 13.29	I 8.74	15 42 12.45

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	"	m s	h m s
Nov. 16	15 27 8.13	5.54	-18 49 15.7	6.3	10.325	-37.24	-15 4.44	16 13.29	1 8.74	15 42 12.45
17	15 31 16.35	13.78	19 3 59.4	50.4	10.359	36.39	14 52.78	16 13.50	1 8.85	15 46 9.00
18	15 35 25.40	22.86	19 18 22.7	14.1	10.394	35.53	14 40.30	16 13.70	1 8.97	15 50 5.56
19	15 39 35.28	32.76	19 32 25.1	16.8	10.429	34.66	14 26.97	16 13.90	1 9.08	15 54 2.12
20	15 43 45.98	43.50	19 45 66.5	58.4	10.463	33.77	14 12.83	16 14.10	1 9.19	15 57 58.67
21	15 47 57.51	55.06	-19 59 26.2	18.5	10.497	-32.86	-13 57.87	16 14.29	1 9.30	16 1 55.23
22	15 52 9.86	7.44	20 12 24.0	16.7	10.531	31.94	13 42.09	16 14.47	1 9.41	16 5 51.78
23	15 56 23.00	20.63	20 24 59.5	52.6	10.564	31.01	13 25.51	16 14.65	1 9.52	16 9 48.34
24	16 10 36.93	34.61	20 37 12.6	6.0	10.597	30.06	13 8.14	16 14.83	1 9.62	16 13 44.90
25	16 4 51.67	49.39	20 48 62.5	56.3	10.630	29.10	12 49.95	16 15.00	1 9.72	16 17 41.45
26	16 9 7.17	4.95	-21 0 29.2	23.4	10.661	-28.12	-12 31.02	16 15.16	1 9.82	16 21 38.01
27	16 13 23.42	21.25	21 11 32.3	26.8	10.692	27.13	12 11.32	16 15.32	1 9.92	16 25 34.57
28	16 17 40.40	38.28	21 22 11.4	6.2	10.722	26.12	11 50.89	16 15.48	1 10.02	16 29 31.12
29	16 21 58.10	56.04	21 32 26.1	21.4	10.752	25.10	11 29.75	16 15.64	1 10.11	16 33 27.68
30	16 26 16.50	14.50	21 42 16.3	11.9	10.780	24.07	11 7.91	16 15.79	1 10.20	16 37 24.24
Dec. 1	16 30 35.56	33.63	-21 51 41.6	37.5	10.807	-23.03	-10 45.40	16 15.94	1 10.29	16 41 20.80
2	16 34 55.27	53.40	22 0 41.8	37.9	10.833	21.97	10 22.26	16 16.09	1 10.38	16 45 17.36
3	16 39 15.58	13.78	22 9 16.3	12.9	10.859	20.90	9 58.50	16 16.24	1 10.46	16 49 13.91
4	16 43 36.50	34.76	22 17 25.3	22.1	10.883	19.83	9 34.15	16 16.38	1 10.54	16 53 10.47
5	16 47 57.97	56.30	22 25 8.1	5.2	10.906	18.74	9 9.24	16 16.52	1 10.61	16 57 7.03
6	16 52 19.96	18.36	-22 32 24.7	22.2	10.927	-17.63	-8 43.79	16 16.66	1 10.68	17 1 3.58
7	16 56 42.45	40.93	22 39 15.0	12.7	10.947	16.53	8 17.84	16 16.79	1 10.75	17 5 0.14
8	17 1 5.42	3.99	22 45 38.6	36.5	10.966	15.42	7 51.43	16 16.92	1 10.82	17 8 56.70
9	17 5 28.83	27.47	22 51 35.3	33.6	10.983	14.30	7 24.59	16 17.04	1 10.88	17 12 53.26
10	17 9 52.63	51.36	22 57 4.9	3.3	10.999	13.17	6 57.31	16 17.16	1 10.94	17 16 49.82
11	17 14 16.83	15.64	-23 2 7.3	6.0	11.015	-12.03	-6 29.66	16 17.27	1 10.99	17 20 46.37
12	17 18 41.38	40.27	23 6 42.4	41.2	11.030	10.88	6 1.66	16 17.38	1 11.04	17 24 42.93
13	17 23 6.25	5.23	23 10 49.8	48.9	11.043	9.73	5 33.34	16 17.48	1 11.08	17 28 39.49
14	17 27 31.42	30.49	23 14 29.6	29.0	11.054	8.58	5 4.72	16 17.58	1 11.12	17 32 36.05
15	17 31 56.85	56.00	23 17 41.8	41.1	11.064	7.42	4 35.84	16 17.68	1 11.15	17 36 32.60
16	17 36 22.52	21.76	-23 20 25.8	25.5	11.073	-6.26	-4 6.72	16 17.77	1 11.18	17 40 29.16
17	17 40 48.40	47.73	23 22 42.0	41.6	11.081	5.09	3 37.40	16 17.84	1 11.21	17 44 25.72
18	17 45 14.45	13.87	23 24 30.0	29.8	11.088	3.92	3 7.89	16 17.91	1 11.23	17 48 22.28
19	17 49 40.65	40.17	23 25 49.8	49.7	11.094	2.74	2 38.23	16 17.98	1 11.25	17 52 18.84
20	17 54 6.97	6.58	23 26 41.5	41.5	11.099	1.56	2 8.46	16 18.04	1 11.26	17 56 15.40
21	17 58 33.39	33.09	-23 27 4.9	4.9	11.102	-0.39	-1 38.60	16 18.10	1 11.27	18 0 11.95
22	18 2 59.86	59.65	23 27 0.0	0.0	11.103	+0.79	1 8.66	16 18.15	1 11.27	18 4 8.51
23	18 7 26.35	26.24	23 26 26.8	26.8	11.104	1.97	0 38.72	16 18.19	1 11.27	18 8 5.07
24	18 11 52.85	52.82	23 25 25.2	25.2	11.103	3.15	-0 8.77	16 18.23	1 11.26	18 12 1.63
25	18 16 19.30	19.37	23 23 55.3	55.3	11.100	4.33	+0 21.14	16 18.26	1 11.25	18 15 58.18
26	18 20 45.68	45.83	-23 21 57.3	57.2	11.097	+5.51	+0 50.95	16 18.29	1 11.24	18 19 54.74
27	18 25 11.94	12.20	23 19 31.0	30.9	11.092	6.68	1 20.67	16 18.31	1 11.22	18 23 51.30
28	18 29 38.07	38.41	23 16 36.6	36.3	11.085	7.85	1 50.25	16 18.33	1 11.19	18 27 47.86
29	18 34 4.01	4.43	23 13 14.0	13.6	11.076	9.02	2 19.64	16 18.35	1 11.16	18 31 44.42
30	18 38 29.73	30.24	23 9 23.6	23.1	11.066	10.18	2 48.81	16 18.36	1 11.13	18 35 40.97
31	18 42 55.19	55.80	-23 5 5.2	4.6	11.055	+11.34	+3 17.72	16 18.37	1 11.09	18 39 37.53
32	18 47 20.37	21.07	-23 0 19.3	18.7	11.042	+12.49	+3 46.36	16 18.38	1 11.05	18 43 34.09

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Jan. 1	15 52.92	1.715	10 40 2.90	113.06	+ 3 24 4.0	-773.4	61.71	14 55.9	54 41.2	II. S.
2	16 34.34	1.744	11 25 31.66	114.77	- 1 49 48.0	-791.8	62.25	15 4.4	55 12.3	II. S.
3	17 17.00	1.819	12 12 14.85	119.30	- 7 5 45.0	-783.0	63.53	15 15.3	55 52.6	II. S.
4	18 2.06	1.944	13 1 22.48	126.83	-12 11 49.0	-741.0	65.57	15 28.6	56 41.5	II. S.
5	18 50.70	2.116	13 54 5.53	137.20	-16 52 42.4	-655.1	68.27	15 43.9	57 37.5	II. S.
6	19 43.91	2.321	14 51 23.52	149.50	-20 48 25.2	-513.0	71.33	16 0.2	58 37.5	II. S.
7	20 42.09	2.522	15 53 40.23	161.60	-23 34 24.7	-305.9	74.20	16 16.3	59 36.7	II. S.
8	21 44.51	2.664	17 0 12.02	170.16	-24 45 15.5	- 40.3	76.15	16 30.5	60 28.8	II. S.
9	22 49.10	2.698	18 8 54.74	172.17	-24 2 45.2	+253.8	76.57	16 41.0	61 7.2	II. N.
10	23 53.07	2.616	19 17 0.20	167.27	-21 24 46.3	328.9	75.39	16 46.1	61 26.0	
12	0 54.11	2.463	20 22 8.83	158.02	-17 7 50.4	+743.1	73.20	16 45.1	61 22.4	
13	1 51.17	2.294	21 23 18.35	147.88	-11 41 0.5	877.2	70.75	16 38.3	60 57.3	I. S.
14	2 44.44	2.132	22 20 40.00	139.33	- 5 36 34.7	932.8	68.66	16 26.7	60 14.8	I. S.
15	3 34.82	2.055	23 15 7.69	133.48	+ 0 36 30.0	923.0	67.21	16 12.1	59 21.1	I. S.
16	4 23.45	2.005	0 7 49.90	130.50	6 35 2.2	862.4	66.49	15 56.2	58 22.6	I. S.
17	5 11.41	1.998	0 59 52.19	130.07	+12 1 16.8	+763.1	66.41	15 40.4	57 24.6	I. S.
18	5 59.59	2.021	1 52 7.60	131.46	16 41 32.4	633.6	66.79	15 25.8	56 31.2	I. S.
19	6 48.56	2.060	2 45 9.86	133.79	20 24 55.2	479.6	67.38	15 13.3	55 45.1	I. S.
20	7 38.45	2.096	3 39 8.27	135.96	23 2 46.4	307.1	67.89	15 3.0	55 7.5	I. S.
21	8 28.99	2.111	4 33 45.60	136.88	24 29 2.9	+123.2	68.07	14 55.2	54 38.5	I. S.
22	9 19.53	2.094	5 28 22.78	135.87	+24 41 7.3	- 62.2	67.73	14 49.5	54 17.8	I. S.
23	10 9.25	2.044	6 22 10.92	132.83	23 40 30.1	-238.5	66.87	14 46.0	54 4.7	I. N.
24	10 57.45	1.969	7 14 27.20	128.34	21 32 47.0	-396.3	65.63	14 44.2	53 58.3	I. N.
25	11 43.71	1.886	8 4 47.13	123.31	18 26 44.6	-329.4	64.26	14 44.1	53 57.9	I. N. S.
26	12 28.02	1.809	8 53 9.29	118.68	14 32 57.4	-634.8	63.00	14 45.5	54 2.9	II. S.
27	13 10.68	1.751	9 39 52.81	115.21	+10 2 37.4	-712.2	62.06	14 48.2	54 13.1	II. S.
28	13 52.29	1.722	10 25 32.79	113.46	+ 5 6 49.8	-762.2	61.62	14 52.5	54 28.6	II. S.
29	14 33.61	1.728	11 10 55.37	113.81	- 0 3 35.8	-785.4	61.78	14 58.3	54 49.9	II. S.
30	15 15.54	1.773	11 56 54.63	116.56	- 5 17 47.3	-780.8	62.61	15 5.7	55 17.4	II. S.
31	15 59.08	1.862	12 44 30.33	121.86	-10 24 7.2	-745.4	64.12	15 15.1	55 51.6	II. S.
Feb. 1	16 45.25	1.993	13 34 44.63	129.74	-15 9 13.1	-673.4	66.27	15 26.2	56 32.6	II. S.
2	17 35.01	2.159	14 28 35.18	139.77	-19 16 53.8	-556.8	68.90	15 39.1	57 19.9	II. S.
3	18 29.01	2.341	15 26 40.71	150.70	-22 27 39.7	-387.8	71.64	15 53.3	58 11.9	II. S.
4	19 27.22	2.502	16 28 59.23	160.40	-24 19 54.2	-164.8	73.97	16 7.8	59 5.5	II. S.
5	20 28.59	2.598	17 34 28.32	166.17	-24 34 0.7	+ 99.2	75.28	16 21.7	59 56.3	II. S.
6	21 31.17	2.601	18 41 9.74	166.31	-22 59 0.4	+374.4	75.24	16 33.2	60 38.5	II. N.
7	22 32.74	2.519	19 46 50.32	161.39	-19 38 13.1	621.7	74.01	16 40.7	61 6.1	II. N.
8	23 31.70	2.392	20 49 54.57	153.76	-14 49 41.3	809.0	72.13	16 43.0	61 14.5	
10	0 27.53	2.263	21 49 50.06	146.03	- 9 1 11.4	920.4	70.20	16 39.6	61 2.0	
11	1 20.57	2.162	22 46 57.50	139.94	- 2 43 31.5	955.8	68.69	16 30.7	60 29.7	I. S.
12	2 11.63	2.100	23 42 6.44	136.20	+ 3 34 33.8	+924.6	67.79	16 17.9	59 42.3	I. S.
13	3 1.68	2.076	0 36 13.89	134.77	9 28 56.5	839.8	67.48	16 2.3	58 45.3	I. S.
14	3 51.54	2.082	1 30 10.01	135.15	14 40 38.8	713.1	67.64	15 46.0	57 45.3	I. S.
15	4 41.77	2.105	2 24 28.89	136.52	18 55 27.5	556.7	68.05	15 30.3	56 47.5	I. S.
16	5 32.58	2.128	3 19 22.58	137.88	+22 3 15.6	+379.7	68.43	15 16.2	55 55.9	I. S.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Feb. 16	5 32.58	2.128	3 19 22.58	137.88	+22 3 15.6	+379.7	68.43	15 16.2	55 55.9	I. S.
17	6 23.77	2.134	4 14 39.00	138.26	23 57 46.5	191.9	68.53	15 4.6	55 13.1	I. S.
18	7 14.81	2.113	5 9 45.86	137.01	24 36 38.0	+ 3.1	68.17	14 55.6	54 40.3	I. S.
19	8 4.98	2.064	6 4 1.37	134.02	24 1 25.4	-177.0	67.34	14 49.4	54 17.7	I. N. S.
20	8 53.68	1.992	6 56 47.86	129.70	22 17 19.1	-340.2	66.14	14 46.1	54 5.1	I. N.
21	9 40.53	1.912	7 47 42.89	124.87	+19 32 13.4	-481.2	64.78	14 45.1	54 1.4	I. N.
22	10 25.48	1.836	8 36 43.94	120.34	15 55 42.5	-597.0	63.48	14 46.1	54 5.3	I. N.
23	11 8.81	1.778	9 24 7.15	116.81	11 38 9.2	-686.3	62.47	14 48.9	54 15.7	I. N.
24	11 51.02	1.744	10 10 23.17	114.80	6 50 16.6	-748.5	61.89	14 53.2	54 31.4	I. S.
25	12 32.79	1.742	10 56 12.92	114.68	+ 1 43 3.4	-782.9	61.84	14 58.7	54 51.4	II. S.
26	13 14.92	1.775	11 42 24.23	116.65	- 3 32 3.7	-787.6	62.42	15 5.1	55 15.0	II. S.
27	13 58.27	1.844	12 29 49.23	120.83	- 8 42 44.6	-760.1	63.61	15 12.5	55 42.2	II. S.
28	14 43.74	1.950	13 19 21.39	127.20	-13 35 15.4	-696.0	65.38	15 20.7	56 12.4	II. S.
Mar. 1	15 32.14	2.087	14 11 49.70	135.40	-17 53 58.1	-590.1	67.60	15 29.9	56 46.0	II. S.
2	16 24.04	2.239	15 7 48.63	144.54	-21 21 15.5	-438.3	69.98	15 39.9	57 22.8	II. S.
3	17 19.51	2.379	16 7 22.68	153.01	-23 38 25.4	-240.1	72.12	15 50.6	58 2.1	II. S.
4	18 17.90	2.476	17 9 52.24	158.83	-24 28 17.9	- 4.3	73.54	16 1.6	58 42.5	II. S.
5	19 17.82	2.504	18 13 53.56	160.51	-23 39 28.0	+249.1	73.91	16 12.2	59 21.4	II. N.
6	20 17.53	2.462	19 17 42.67	157.95	-21 10 22.6	492.1	73.25	16 21.5	59 55.5	II. N.
7	21 15.61	2.373	20 19 53.44	152.63	-17 10 49.6	697.4	71.88	16 28.3	60 20.5	II. N.
8	22 11.35	2.273	21 19 44.02	146.61	-12 0 4.6	+845.7	70.33	16 31.5	60 32.4	II. N.
9	23 4.85	2.189	22 17 18.80	141.55	- 6 3 7.6	927.7	69.01	16 30.4	60 28.4	II. N.
10	23 56.67	2.136	23 13 13.46	138.36	+ 0 13 3.1	942.2	68.18	16 24.8	60 7.7	
12	0 47.65	2.118	0 8 16.89	137.26	6 22 17.1	894.0	67.90	16 15.1	59 32.1	
13	1 38.55	2.128	1 3 15.85	137.90	12 1 7.1	791.8	68.10	16 2.3	58 45.1	I. S.
14	2 29.93	2.155	1 58 43.61	139.50	+16 50 1.4	+646.4	68.57	15 47.8	57 51.9	I. S.
15	3 21.97	2.181	2 54 51.55	141.06	20 34 8.7	470.2	69.04	15 33.0	56 57.5	I. S.
16	4 14.45	2.188	3 51 25.44	141.50	23 3 50.2	276.6	69.22	15 19.1	56 6.6	I. S.
17	5 6.76	2.165	4 47 49.09	140.13	24 14 55.9	+ 79.5	68.92	15 7.2	55 22.8	I. S.
18	5 58.12	2.110	5 43 15.87	136.80	24 8 31.2	-109.1	68.08	14 57.8	54 48.2	I. S.
19	6 47.85	2.031	6 37 4.22	132.06	+22 50 0.9	-279.8	66.84	14 51.3	54 24.4	I. N.
20	7 35.54	1.943	7 28 49.86	126.75	20 27 41.4	-427.6	65.40	14 47.8	54 11.6	I. N.
21	8 21.15	1.860	8 18 30.58	121.79	17 11 9.8	-550.7	64.00	14 47.2	54 9.2	I. N.
22	9 4.98	1.796	9 6 24.01	117.90	13 10 23.7	-649.0	62.87	14 49.2	54 16.6	I. N.
23	9 47.56	1.758	9 53 2.63	115.61	8 35 17.8	-722.4	62.17	14 53.4	54 32.1	I. N.
24	10 29.61	1.752	10 39 8.71	115.24	+ 3 35 56.4	-770.0	62.00	14 59.4	54 54.2	I. N.
25	11 11.92	1.780	11 25 30.78	116.97	- 1 36 57.3	-789.4	62.44	15 6.7	55 21.0	I. N. S.
26	11 55.35	1.846	12 13 0.78	120.90	- 6 51 20.9	-776.7	63.49	15 14.8	55 50.7	I. S.
27	12 40.79	1.946	13 2 31.01	126.95	-11 53 15.7	-726.2	65.12	15 23.3	56 21.8	II. S.
28	13 29.01	2.076	13 54 48.48	134.72	-16 26 23.6	-631.8	67.19	15 31.7	56 52.9	II. S.
29	14 20.53	2.219	14 50 24.94	143.33	-20 12 20.9	-489.8	69.44	15 40.0	57 23.1	II. S.
30	15 15.40	2.350	15 49 22.78	151.22	-22 51 57.1	-300.9	71.46	15 47.8	57 52.0	II. S.
31	16 12.97	2.438	16 51 2.50	156.51	-24 8 4.6	- 75.0	72.81	15 55.2	58 19.1	II. S.
Apr. 1	17 11.88	2.460	17 54 3.59	157.86	-23 49 35.0	+168.2	73.18	16 2.0	58 44.0	II. S.
2	18 10.51	2.416	18 56 47.47	155.21	-21 54 37.3	+403.0	72.56	16 8.0	59 6.0	II. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Data.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Apr. 2	18 10.51	2.416	18 56 47.47	155.21	-21 54 37.3	+403.0	72.56	16 8.0	59 6.0	II. N.
3	19 7.50	2.329	19 57 52.82	149.95	-18 31 19.8	606.7	71.25	16 12.9	59 24.0	II. N.
4	20 2.20	2.230	20 56 40.22	144.04	-13 55 37.8	763.2	69.73	16 16.2	59 36.1	II. N.
5	20 54.68	2.148	21 53 14.53	139.11	-8 27 59.9	865.4	68.42	16 17.3	59 40.3	II. N.
6	21 45.56	2.098	22 48 11.96	136.06	-2 30 53.5	910.5	67.58	16 15.9	59 34.9	II. N.
7	22 35.67	2.085	23 42 23.65	135.28	+3 32 47.2	+898.5	67.33	16 11.4	59 18.7	II. N.
8	23 25.89	2.105	0 36 41.45	136.50	9 20 35.0	891.7	67.61	16 4.1	58 51.6	
10	0 16.89	2.147	1 31 46.24	139.06	14 31 24.6	714.7	68.25	15 54.2	58 15.4	
11	1 8.99	2.194	2 27 57.81	141.85	18 46 45.3	556.0	68.99	15 42.6	57 32.9	I. S.
12	2 2.06	2.224	3 25 7.18	143.66	21 52 14.9	367.8	69.50	15 30.3	56 47.6	I. S.
13	2 55.46	2.219	4 22 36.28	143.36	+23 39 13.7	+166.2	69.49	15 18.2	56 3.3	I. S.
14	3 48.24	2.173	5 19 28.26	140.57	24 5 35.8	-32.6	68.86	15 7.4	55 23.6	I. S.
15	4 39.46	2.091	6 14 46.41	135.68	23 15 24.6	-214.8	67.66	14 58.6	54 51.3	I. N.
16	5 28.48	1.992	7 7 52.16	129.73	21 17 4.1	-372.5	66.15	14 52.4	54 28.5	I. N.
17	6 15.10	1.895	7 58 33.80	123.84	18 21 3.0	-503.1	64.60	14 49.1	54 16.4	I. N.
18	6 59.56	1.814	8 47 5.23	119.01	+14 38 4.3	-607.6	63.27	14 48.8	54 15.3	I. N.
19	7 42.40	1.761	9 33 59.36	115.83	10 18 13.9	-687.8	62.35	14 51.5	54 25.0	I. N.
20	8 24.38	1.743	10 20 1.34	114.71	5 30 58.9	-744.6	61.98	14 56.8	54 44.7	I. N.
21	9 6.36	1.762	11 6 3.68	115.89	+0 25 47.6	-777.0	62.24	15 4.4	55 12.6	I. N.
22	9 49.29	1.822	11 53 3.19	119.48	-4 46 52.9	-781.1	63.16	15 13.8	55 47.0	I. N.
23	10 34.14	1.921	12 41 58.15	125.46	-9 54 31.0	-750.6	64.72	15 24.1	56 25.0	I. N.
24	11 21.82	2.057	13 33 43.42	133.59	-14 41 35.7	-676.9	66.82	15 34.8	57 4.1	I. S.
25	12 13.03	2.212	14 29 0.56	142.95	-18 49 16.1	-552.5	69.19	15 44.9	57 41.2	II. S.
26	13 7.95	2.361	15 28 1.83	151.93	-21 56 26.0	-374.6	71.45	15 53.8	58 14.0	II. S.
27	14 6.04	2.469	16 30 12.90	158.37	-23 42 48.3	-151.0	73.05	16 1.0	58 40.5	II. S.
28	15 5.85	2.502	17 34 8.06	160.38	-23 53 57.1	+97.0	73.60	16 6.3	58 59.9	II. S.
29	16 5.49	2.456	18 37 52.65	157.59	-22 25 55.1	339.8	73.00	16 9.7	59 12.2	II. N.
30	17 3.27	2.353	19 39 45.70	151.44	-19 26 30.8	550.2	71.55	16 11.2	59 17.7	II. N.
May 1	17 58.31	2.233	20 38 53.52	144.22	-15 12 19.4	712.0	69.78	16 11.1	59 17.4	II. N.
2	18 50.59	2.128	21 35 15.36	137.89	-10 4 7.5	820.0	68.17	16 9.6	59 11.8	II. N.
3	19 40.73	2.058	22 29 28.84	133.65	-4 23 22.5	+875.1	67.03	16 6.7	59 1.2	II. N.
4	20 29.68	2.089	23 22 30.62	131.94	+1 29 15.0	879.9	66.54	16 2.4	58 45.6	II. N.
5	21 18.45	2.041	0 15 21.43	132.68	7 14 3.2	836.2	66.67	15 56.8	58 24.8	II. N.
6	22 7.93	2.086	1 8 54.55	135.35	12 32 3.5	746.3	67.30	15 49.7	57 58.9	II. N.
7	22 58.70	2.146	2 3 45.75	138.99	17 5 15.4	612.9	68.19	15 41.4	57 28.2	
8	23 50.91	2.202	3 0 3.57	142.33	+20 37 34.6	+443.4	69.02	15 32.0	56 54.0	
10	0 44.15	2.229	3 57 23.34	143.94	22 56 43.4	249.5	69.44	15 22.3	56 18.2	
11	1 37.52	2.211	4 54 50.73	142.86	23 56 11.7	+47.9	69.21	15 12.6	55 42.7	I. S.
12	2 29.89	2.147	5 51 18.13	139.02	23 36 20.6	-144.4	68.30	15 3.8	55 10.4	I. S.
13	3 20.30	2.050	6 45 47.43	133.21	22 3 39.6	-314.6	66.88	14 56.5	54 43.6	I. N.
14	4 8.22	1.943	7 37 46.95	126.75	+19 28 32.5	-456.1	65.24	14 51.3	54 24.4	I. N.
15	4 53.63	1.845	8 27 15.97	120.86	16 2 42.5	-568.4	63.71	14 48.6	54 14.5	I. N.
16	5 36.96	1.771	9 14 39.34	116.41	11 57 23.8	-653.9	62.52	14 48.7	54 15.0	I. N.
17	6 18.90	1.730	10 0 39.28	113.97	7 22 41.2	-715.8	61.85	14 51.8	54 26.3	I. N.
18	7 0.34	1.729	10 46 8.55	113.90	+2 27 44.3	-755.2	61.81	14 57.9	54 48.5	I. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi- diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
May 18	7 0.34	1.729	10 46 8.55	113.90	+ 2 27 44.3	-755.2	61.81	14 57.9	54 48.5	I. N.
19	7 42.24	1.771	11 32 6.53	116.39	- 2 38 18.7	-770.9	62.46	15 6.6	55 20.5	I. N.
20	8 25.68	1.857	12 19 36.59	121.58	- 7 45 9.6	-758.0	63.82	15 17.6	56 0.8	I. N.
21	9 11.72	1.986	13 9 42.90	129.37	-12 39 54.4	-708.7	65.84	15 30.1	56 46.8	I. N.
22	10 1.32	2.151	14 3 23.39	139.27	-17 5 53.1	-612.4	68.34	15 43.2	57 35.1	I. N.
23	10 55.08	2.329	15 1 14.86	149.99	-20 42 21.0	-460.0	70.97	15 56.0	58 21.9	I. N. S.
24	11 52.92	2.483	16 3 11.09	159.22	-23 6 18.8	-250.9	73.19	16 7.1	59 2.6	I. S.
25	12 53.69	2.567	17 8 3.96	164.28	-23 57 24.6	+ 0.2	74.42	16 15.6	59 34.0	II. S.
26	13 55.36	2.556	18 13 50.58	163.60	-23 4 45.1	261.7	74.29	16 20.6	59 52.4	II. N. S.
27	14 55.69	2.461	19 18 16.64	157.90	-20 31 33.5	497.3	72.99	16 22.2	59 58.3	II. N.
28	15 53.13	2.323	20 19 49.11	149.63	-16 33 56.3	+680.9	71.03	16 20.5	59 52.0	II. N.
29	16 47.21	2.187	21 17 59.78	141.45	-11 35 4.0	803.1	69.04	16 16.2	59 36.1	II. N.
30	17 38.37	2.083	22 13 14.25	135.16	- 5 59 20.1	866.2	67.46	16 9.9	59 13.2	II. N.
31	18 27.53	2.022	23 6 28.37	131.49	- 0 9 6.9	876.8	66.51	16 2.5	58 45.7	II. N.
June 1	19 15.78	2.007	23 58 48.01	130.58	+ 5 35 55.5	841.1	66.24	15 54.3	58 15.7	II. N.
2	20 4.17	2.031	0 51 15.75	132.08	+10 58 13.8	+763.6	66.58	15 45.8	57 44.6	II. N.
3	20 53.51	2.084	1 44 40.94	135.24	15 41 38.8	647.2	67.34	15 37.3	57 13.1	II. N.
4	21 44.26	2.145	2 39 30.65	138.91	19 31 18.1	495.7	68.22	15 28.7	56 41.6	II. N.
5	22 36.35	2.192	3 35 41.38	141.73	22 14 27.4	316.4	68.89	15 20.2	56 10.6	II. N.
6	23 29.18	2.203	4 32 36.50	142.42	23 42 15.5	+121.4	69.04	15 12.1	55 40.7	
8	0 21.74	2.168	5 29 14.92	140.31	+23 51 31.5	- 73.5	68.50	15 4.4	55 12.6	
9	1 12.92	2.091	6 24 30.76	135.66	22 45 26.5	-253.1	67.34	14 57.7	54 47.8	I. N.
10	2 1.91	1.989	7 17 34.82	129.54	20 32 28.6	-406.8	65.80	14 52.2	54 27.6	I. N.
11	2 48.38	1.884	8 8 7.08	123.22	17 24 5.0	-530.2	64.19	14 48.3	54 13.4	I. N.
12	3 32.48	1.794	8 56 16.72	117.82	13 32 21.7	-623.8	62.78	14 46.5	54 6.9	I. N.
13	4 14.73	1.732	9 42 35.37	114.08	+ 9 8 35.5	-690.9	61.81	14 47.2	54 9.3	I. N.
14	4 55.91	1.706	10 27 49.37	112.48	+ 4 22 47.9	-734.2	61.41	14 50.6	54 21.7	I. N.
15	5 36.93	1.720	11 12 54.24	113.36	- 0 35 53.3	-755.4	61.67	14 56.8	54 44.5	I. N.
16	6 18.83	1.779	11 58 51.62	116.89	- 5 38 18.4	-752.4	62.65	15 5.8	55 17.7	I. N.
17	7 2.70	1.884	12 46 47.32	123.22	-10 33 59.0	-720.4	64.35	15 17.5	56 0.7	I. N.
18	7 49.63	2.034	13 37 47.45	132.20	-15 9 40.0	-650.7	66.69	15 31.3	56 51.3	I. N.
19	8 40.58	2.216	14 32 49.26	143.17	-19 8 5.7	-532.3	69.43	15 46.4	57 46.6	I. N.
20	9 36.04	2.404	15 32 22.98	154.50	-22 7 49.2	-356.4	72.17	16 1.5	58 42.3	I. N.
21	10 35.66	2.554	16 36 6.52	163.48	-23 45 41.2	-124.7	74.28	16 15.4	59 33.2	I. N. S.
22	11 37.93	2.618	17 42 29.18	167.37	-23 42 49.2	+142.1	75.16	16 26.4	60 13.5	I. S.
23	12 40.50	2.580	18 49 10.49	165.08	-21 52 16.7	+406.6	74.62	16 33.3	60 38.8	II. N.
24	13 41.14	2.464	19 53 55.37	158.10	-18 23 2.3	630.1	72.99	16 35.3	60 46.4	II. N.
25	14 38.54	2.318	20 55 25.21	149.33	-13 37 0.7	788.4	70.91	16 32.6	60 36.4	II. N.
26	15 32.53	2.186	21 53 30.03	141.35	- 8 1 52.4	876.0	68.98	16 25.8	60 11.5	II. N.
27	16 23.76	2.091	22 48 48.62	135.65	- 2 4 45.1	899.8	67.57	16 16.1	59 35.7	II. N.
28	17 13.24	2.041	23 42 22.57	132.66	+ 3 50 49.7	+870.0	66.83	16 4.6	58 53.6	II. N.
29	18 2.07	2.035	0 35 16.97	132.28	9 25 21.3	795.9	66.74	15 52.6	58 9.4	II. N.
30	18 51.18	2.062	1 28 28.23	133.95	14 22 32.1	684.2	67.15	15 40.7	57 25.9	II. N.
July 1	19 41.22	2.109	2 22 34.91	136.72	18 28 26.9	540.5	67.83	15 29.6	56 45.2	II. N.
2	20 32.38	2.153	3 17 49.91	139.42	+21 31 24.2	+370.6	68.46	15 19.6	56 8.4	II. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
July 2	20 32.38	2.153	3 17 49.91	139.42	+21 31 24.2	+370.6	68.46	15 19.6	56 8.4	II. N.
3	21 24.40	2.176	4 13 55.91	140.77	23 22 36.1	+183.5	68.73	15 10.8	55 35.9	II. N.
4	22 16.52	2.161	5 10 8.41	139.85	23 57 33.0	- 8.4	68.45	15 3.1	55 7.8	II. N.
5	23 7.78	2.105	6 5 29.11	136.49	23 17 2.9	-191.5	67.55	14 56.7	54 44.1	
6	23 57.30	2.018	6 59 5.00	131.28	21 27 8.3	-353.9	66.18	14 51.4	54 24.8	
8	0 44.55	1.919	7 50 24.21	125.29	+18 37 41.2	-488.4	64.61	14 47.5	54 10.4	
9	1 29.44	1.825	8 39 21.62	119.62	15 0 25.8	-592.9	63.12	14 45.1	54 1.6	I. N.
10	2 12.29	1.750	9 26 15.83	115.15	10 47 12.7	-668.6	61.94	14 44.4	53 59.0	I. N.
11	2 53.68	1.705	10 11 42.75	112.44	6 9 4.2	-718.0	61.24	14 45.7	54 3.8	I. N.
12	3 34.40	1.695	10 56 29.44	111.84	+ 1 16 1.6	-743.3	61.14	14 49.3	54 16.9	I. N.
13	4 15.36	1.725	11 41 30.43	113.66	- 3 42 30.7	-745.3	61.70	14 55.3	54 39.1	I. N.
14	4 57.56	1.798	12 27 45.48	118.04	- 8 36 52.2	-721.9	62.96	15 4.0	55 11.1	I. N.
15	5 42.03	1.915	13 16 17.57	125.06	-13 15 59.7	-668.1	64.87	15 15.3	55 52.6	I. N.
16	6 29.79	2.071	14 8 7.91	134.48	-17 26 9.6	-575.5	67.34	15 29.0	56 42.8	I. N.
17	7 21.67	2.254	15 4 5.30	145.43	-20 50 1.4	-435.0	70.09	15 44.5	57 39.7	I. N.
18	8 17.93	2.431	16 4 27.06	156.12	-23 6 57.0	-240.5	72.67	16 0.8	58 39.6	I. N.
19	9 17.98	2.561	17 8 36.37	163.93	-23 55 56.4	+ 2.3	74.47	16 16.6	59 37.5	I. N.
20	10 20.17	2.605	18 14 54.55	166.60	-23 1 44.5	269.9	75.04	16 30.1	60 27.1	I. S.
21	11 22.28	2.557	19 21 8.09	163.68	-20 21 40.9	524.9	74.32	16 39.6	61 2.2	I. N. S.
22	12 22.40	2.446	20 25 21.65	157.02	-16 8 26.3	730.7	72.71	16 43.9	61 18.0	II. N.
23	13 19.56	2.318	21 26 37.39	149.31	-10 46 37.2	+865.7	70.85	16 42.4	61 12.6	II. N.
24	14 13.81	2.208	22 24 57.72	142.70	- 4 45 57.1	925.4	69.24	16 35.6	60 47.5	II. N.
25	15 5.84	2.134	23 21 4.26	138.26	+ 1 24 38.6	917.1	68.18	16 24.6	60 7.1	II. N.
26	15 56.58	2.101	0 15 54.08	136.28	7 20 13.6	852.4	67.73	16 10.9	59 16.5	II. N.
27	16 46.98	2.103	1 10 22.55	136.39	12 40 38.6	743.1	67.80	15 56.0	58 21.8	II. N.
28	17 37.71	2.127	2 5 11.55	137.85	+17 10 5.0	+599.1	68.19	15 41.2	57 27.7	II. N.
29	18 29.13	2.156	3 0 41.26	139.59	20 36 29.6	429.4	68.63	15 27.6	56 37.6	II. N.
30	19 21.11	2.172	3 56 45.42	140.52	22 51 28.1	243.6	68.83	15 15.6	55 53.7	II. N.
31	20 13.14	2.159	4 52 52.52	139.73	23 50 41.1	+ 52.6	68.57	15 5.6	55 16.9	II. N.
Aug. 1	21 4.45	2.111	5 48 15.71	136.87	23 34 24.3	-131.9	67.77	14 57.6	54 47.5	II. N.
2	21 54.24	2.035	6 42 8.02	132.27	+22 7 26.5	-299.4	66.51	14 51.5	54 25.1	II. S.
3	22 41.98	1.943	7 33 57.00	126.75	19 38 14.6	-442.2	65.01	14 47.2	54 9.3	II. S.
4	23 27.50	1.851	8 23 31.95	121.25	16 17 27.1	-557.0	63.51	14 44.5	53 59.5	
6	0 10.97	1.774	9 11 3.74	116.60	12 16 29.2	-643.1	62.23	14 43.4	53 55.5	
7	0 52.85	1.721	9 57 0.07	113.38	7 46 35.2	-702.0	61.35	14 43.9	53 57.3	
8	1 33.79	1.697	10 42 0.06	111.96	+ 2 58 25.3	-734.7	60.99	14 46.0	54 5.0	I. N.
9	2 14.58	1.708	11 26 50.31	112.60	- 1 57 51.0	-742.5	61.22	14 49.9	54 19.3	I. N.
10	2 56.05	1.755	12 12 22.37	115.46	- 6 52 9.2	-724.6	62.08	14 55.8	54 40.8	I. N.
11	3 39.14	1.841	12 59 30.96	120.64	-11 33 48.1	-678.6	63.56	15 3.7	55 10.0	I. N.
12	4 24.73	1.964	13 49 10.79	128.03	-15 50 40.0	-599.7	65.59	15 14.0	55 47.5	I. N.
13	5 13.65	2.116	14 42 10.23	137.16	-19 28 20.8	-481.6	67.99	15 26.3	56 32.9	I. N.
14	6 6.38	2.278	15 38 59.55	146.93	-22 9 56.5	-318.6	70.47	15 40.5	57 25.1	I. N.
15	7 2.86	2.422	16 39 34.18	155.58	-23 37 8.4	-110.3	72.57	15 56.0	58 21.9	I. N.
16	8 2.22	2.513	17 43 1.90	161.04	-23 33 32.8	+132.4	73.83	16 11.6	59 19.3	I. N.
17	9 2.88	2.599	18 47 48.17	162.04	-21 49 46.9	+385.5	74.01	16 26.0	60 12.2	I. S.



## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Std. Time of Semid. Passing Meridian.	Geocentric Semi- diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Aug. 17	9 2.88	2.529	18 47 48.17	162.04	-21 49 46.9	+385.5	74.01	16 26.0	60 12.2	I. S.
18	10 3.09	2.478	19 52 6.89	158.95	-18 28 1.7	616.9	73.20	16 37.4	60 53.9	I. S.
19	11 1.53	2.389	20 54 39.77	153.57	-13 43 7.1	797.2	71.85	16 44.2	61 19.0	I. S.
20	11 57.73	2.296	21 54 57.36	148.01	-7 59 31.5	908.4	70.47	16 45.4	61 23.3	I. N.
21	12 51.92	2.225	22 53 14.32	143.71	-1 46 21.9	945.1	69.41	16 40.7	61 6.0	II. N.
22	13 44.78	2.186	23 50 11.01	141.34	+ 4 27 13.4	+912.0	68.85	16 30.8	60 29.7	II. N.
23	14 37.08	2.178	0 46 34.41	140.87	10 15 15.7	819.3	68.79	16 17.1	59 39.4	II. N.
24	15 29.47	2.191	1 43 3.08	141.66	15 16 31.0	680.3	69.05	16 1.3	58 41.4	II. N.
25	16 22.28	2.209	2 39 56.68	142.77	19 15 4.2	508.1	69.38	15 45.0	57 41.7	II. N.
26	17 15.41	2.215	3 37 10.01	143.13	22 0 26.9	316.7	69.50	15 29.6	56 45.1	II. N.
27	18 8.39	2.194	4 34 14.00	141.88	+23 27 38.0	+119.5	69.19	15 16.0	55 55.0	II. N.
28	19 0.49	2.142	5 30 24.95	138.71	23 36 55.6	-70.7	68.36	15 4.7	55 13.5	II. N.
29	19 50.98	2.062	6 24 59.28	133.94	22 33 15.2	-244.0	67.08	14 55.9	54 41.3	II. S.
30	20 39.37	1.969	7 17 27.02	128.30	20 24 54.9	-393.4	65.54	14 49.7	54 18.5	II. S.
31	21 25.50	1.876	8 7 38.75	122.75	17 22 6.8	-516.1	63.98	14 45.8	54 4.3	II. S.
Sept. 1	22 9.54	1.797	8 55 45.06	117.97	+13 35 41.6	-611.5	62.63	14 44.1	53 58.0	II. S.
2	22 51.93	1.740	9 42 12.10	114.54	9 16 25.6	-680.4	61.63	14 44.3	53 58.5	II. S.
3	23 33.28	1.711	10 27 36.40	112.79	+ 4 34 47.4	-723.4	61.12	14 46.1	54 5.1	
5	0 14.30	1.713	11 12 40.93	112.91	- 0 18 54.0	-740.6	61.15	14 49.3	54 17.0	
6	0 55.77	1.748	11 58 12.34	115.03	- 5 14 9.2	-731.0	61.76	14 53.9	54 34.0	
7	1 38.49	1.817	12 44 59.01	119.19	- 9 59 51.9	-692.4	62.94	15 0.0	54 56.2	I. N.
8	2 23.24	1.918	13 33 48.40	125.23	-14 23 48.9	-621.6	64.62	15 7.4	55 23.4	I. N.
9	3 10.73	2.043	14 25 22.07	132.78	-18 12 19.0	-514.5	66.68	15 16.3	55 56.1	I. N.
10	4 1.40	2.180	15 20 7.28	141.01	-21 10 11.6	-368.1	68.85	15 26.7	56 34.3	I. N.
11	4 55.29	2.306	16 18 5.61	148.61	-23 1 34.8	-182.7	70.79	15 38.5	57 17.6	I. N.
12	5 51.82	2.397	17 18 43.58	154.06	-23 32 2.7	+ 34.6	72.14	15 51.4	58 5.0	I. N.
13	6 49.90	2.433	18 20 54.29	156.23	-22 31 47.8	267.7	72.64	16 4.6	58 53.7	I. S.
14	7 48.16	2.414	19 23 16.03	155.09	-19 58 55.2	493.6	72.32	16 17.4	59 40.6	I. S.
15	8 45.47	2.358	20 24 40.52	151.71	-16 0 59.8	689.0	71.44	16 28.3	60 20.6	I. S.
16	9 41.26	2.292	21 24 33.67	147.74	-10 54 21.7	834.5	70.38	16 35.8	60 48.6	I. S.
17	10 35.59	2.239	22 22 58.75	144.57	- 5 1 49.9	+917.0	69.55	16 39.1	61 0.4	I. S.
18	11 28.95	2.213	23 20 26.00	143.01	+ 1 10 8.0	931.2	69.13	16 37.1	60 53.1	I. N.
19	12 22.04	2.216	0 17 36.88	143.17	7 14 11.1	878.1	69.18	16 30.0	60 26.8	II. N.
20	13 15.49	2.240	1 15 8.76	144.63	12 44 37.4	764.8	69.57	16 18.5	59 44.8	II. N.
21	14 9.61	2.270	2 13 21.71	146.40	17 19 39.0	603.5	70.07	16 4.1	58 51.9	II. N.
22	15 4.31	2.285	3 12 9.33	147.31	+20 43 11.2	+410.3	70.35	15 48.4	57 53.9	II. N.
23	15 59.02	2.268	4 10 57.44	146.32	22 46 7.7	803.7	70.18	15 32.7	56 56.5	II. N.
24	16 52.87	2.213	5 8 53.57	142.98	23 26 39.5	+ 1.0	69.39	15 18.5	56 4.1	II. N.
25	17 44.97	2.124	6 5 4.55	137.68	22 49 19.9	-183.8	68.07	15 6.4	55 19.7	II. N. S.
26	18 34.70	2.019	6 58 53.53	131.32	21 3 5.1	-342.7	66.41	14 56.9	54 45.1	II. S.
27	19 21.88	1.914	7 50 8.37	125.00	+18 18 56.5	-473.2	64.70	14 50.5	54 21.2	II. S.
28	20 6.68	1.824	8 39 0.57	119.57	14 48 13.3	-576.0	63.18	14 46.8	54 7.7	II. S.
29	20 49.60	1.758	9 25 59.23	115.60	10 41 38.4	-652.8	62.02	14 45.7	54 3.8	II. S.
30	21 31.29	1.722	10 11 43.89	113.45	6 9 13.5	705.3	61.35	14 47.0	54 8.6	II. S.
Oct. 1	22 12.50	1.719	10 57 0.12	113.25	+ 1 20 41.6	-733.2	61.23	14 50.2	54 20.5	II. S.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Oct. 1	22 12.50	1.719	10 57 0.12	113.23	+ 1 20 41.6	-733.2	61.23	14 50.2	54 20.5	II. S.
2	22 54.05	1.749	11 42 36.08	115.09	- 3 33 56.5	-735.4	61.70	14 55.1	54 38.3	
3	23 36.73	1.813	12 29 20.60	118.95	- 8 23 44.0	-708.4	62.73	15 1.2	55 0.6	
5	0 21.32	1.908	13 18 0.15	124.63	-12 56 16.1	-648.3	64.27	15 8.2	55 26.3	
6	1 8.49	2.025	14 9 14.11	131.70	-16 57 24.0	-550.8	66.17	15 15.8	55 54.5	I. N.
7	1 58.62	2.152	15 3 26.73	139.34	-20 11 33.3	-413.3	68.18	15 24.1	56 24.7	I. N.
8	2 51.69	2.267	16 0 36.72	146.25	-22 22 49.4	-237.2	69.98	15 32.8	56 56.6	I. N.
9	3 47.15	2.347	17 0 9.77	151.03	-23 17 14.4	- 30.9	71.23	15 41.9	57 30.1	I. N.
10	4 43.92	2.375	18 1 1.49	152.71	-22 45 37.7	+189.9	71.69	15 51.2	58 4.5	I. N. S.
11	5 40.72	2.351	19 1 55.53	151.33	-20 46 3.7	405.4	71.37	16 0.7	58 39.1	I. S.
12	6 36.52	2.295	20 1 49.27	147.94	-17 24 33.8	+596.7	70.53	16 9.6	59 11.9	I. S.
13	7 30.81	2.230	21 0 12.54	144.06	-12 53 59.3	748.8	69.52	16 17.4	59 40.6	I. S.
14	8 23.70	2.181	21 57 10.86	141.05	- 7 32 6.5	851.8	68.71	16 23.2	60 1.8	I. S.
15	9 15.71	2.159	22 53 16.73	139.78	- 1 39 56.5	899.3	68.32	16 26.1	60 12.5	I. S.
16	10 7.62	2.172	23 49 16.16	140.51	+ 4 19 21.8	887.0	68.45	16 25.4	60 9.8	I. S.
17	11 0.18	2.212	0 45 54.98	142.97	+10 1 38.9	+814.4	69.03	16 20.6	59 52.5	I. N. S.
18	11 53.92	2.267	1 43 45.11	146.25	15 3 16.2	685.0	69.84	16 12.2	59 21.5	II. N.
19	12 48.94	2.314	2 42 51.75	149.08	19 3 22.5	509.1	70.57	16 0.7	58 39.2	II. N.
20	13 44.75	2.339	3 42 45.76	149.97	21 46 35.5	303.9	70.83	15 47.2	57 49.8	II. N.
21	14 40.35	2.296	4 42 27.50	147.97	23 5 22.2	+ 90.5	70.41	15 33.2	56 58.3	II. N.
22	15 34.56	2.215	5 40 45.48	143.09	+23 0 39.3	-110.6	69.27	15 19.8	56 9.0	II. N.
23	16 26.39	2.102	6 36 40.67	136.29	21 40 22.3	-285.7	67.61	15 8.0	55 25.6	II. S.
24	17 15.36	1.980	7 29 43.49	128.95	19 16 24.3	-428.7	65.73	14 58.6	54 51.0	II. S.
25	18 1.50	1.869	8 19 56.16	122.30	16 1 36.3	-540.2	63.97	14 51.9	54 26.7	II. S.
26	18 45.27	1.783	9 7 45.64	117.14	12 7 56.6	-623.7	62.54	14 48.3	54 13.4	II. S.
27	19 27.35	1.730	9 53 54.20	113.95	+ 7 45 56.4	-682.4	61.62	14 47.7	54 11.2	II. S.
28	20 8.59	1.713	10 39 11.94	112.92	+ 3 4 59.1	-718.5	61.28	14 49.9	54 19.3	II. S.
29	20 49.88	1.734	11 24 32.67	114.19	- 1 45 51.2	-731.5	61.55	14 54.6	54 36.4	II. S.
30	21 32.13	1.793	12 10 51.07	117.73	- 6 36 49.4	-718.5	62.47	15 1.3	55 1.0	II. S.
31	22 16.22	1.887	12 59 0.36	123.40	-11 16 33.9	-674.5	63.94	15 9.4	55 30.7	II. S.
Nov. 1	23 2.94	2.010	13 49 47.54	130.78	-15 31 22.2	-592.8	65.85	15 18.4	56 3.7	
2	23 52.81	2.147	14 43 44.90	139.06	-19 5 6.3	-468.3	67.96	15 27.6	56 37.6	
4	0 45.94	2.276	15 40 57.82	146.80	-21 40 15.6	-300.4	69.92	15 36.5	57 10.5	
5	1 41.77	2.368	16 40 53.26	152.31	-23 0 31.7	- 96.1	71.33	15 44.8	57 40.8	I. N.
6	2 39.11	2.400	17 42 19.76	154.24	-22 54 33.9	+127.2	71.86	15 52.1	58 7.6	I. N.
7	3 36.46	2.370	18 43 46.49	152.42	-21 19 18.4	+346.4	71.49	15 58.3	58 30.5	I. S.
8	4 32.50	2.296	19 43 55.03	148.01	-18 20 53.7	539.9	70.46	16 3.5	58 49.5	I. S.
9	5 26.56	2.209	20 42 3.91	142.76	-14 12 43.2	693.5	69.18	16 7.6	59 4.6	I. S.
10	6 18.65	2.136	21 38 14.23	138.35	- 9 12 19.9	800.3	68.07	16 10.5	59 15.4	I. S.
11	7 9.33	2.094	22 32 59.84	135.83	- 3 39 0.2	858.1	67.39	16 12.2	59 21.4	I. S.
12	7 59.46	2.091	23 27 12.66	135.65	+ 2 7 23.2	+865.4	67.30	16 12.1	59 21.2	I. S.
13	8 49.99	2.126	0 21 49.17	137.75	7 46 31.3	821.5	67.77	16 10.1	59 13.7	I. S.
14	9 41.72	2.188	1 17 37.84	141.51	12 57 41.2	725.8	68.66	16 5.8	58 57.8	I. S.
15	10 35.10	2.260	2 15 6.47	145.83	17 20 33.1	581.0	69.69	15 59.0	58 33.2	I. S.
16	11 30.07	2.315	3 14 9.77	149.12	+20 37 2.2	+396.0	70.48	15 50.2	58 0.6	I. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Data.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	"	' "	' "	
Nov. 16	11 30.07	2.315	3 14 9.77	149.12	+20 37 2.2	+396.0	70.48	15 50.2	58 0.6	I. N.
17	12 25.87	2.327	4 14 3.64	149.83	22 34 10.3	+187.5	70.67	15 39.7	57 22.3	II. N.
18	13 21.28	2.282	5 13 34.26	147.15	23 6 46.2	-23.0	70.05	15 28.4	56 40.7	II. N.
19	14 14.99	2.187	6 11 22.27	141.43	22 18 13.2	-215.3	68.68	15 17.1	55 59.2	II. S.
20	15 6.04	2.064	7 6 29.69	134.03	20 18 40.5	-376.6	66.87	15 6.9	55 21.6	II. S.
21	15 54.04	1.938	7 58 34.19	126.43	+17 21 38.0	-302.8	64.95	14 58.4	54 50.4	II. S.
22	16 39.19	1.829	8 47 47.29	119.91	13 40 50.6	-596.0	63.25	14 52.2	54 27.7	II. S.
23	17 22.08	1.751	9 34 44.33	115.20	9 28 34.0	-661.1	62.00	14 48.9	54 15.4	II. S.
24	18 3.52	1.709	10 20 14.32	112.71	4 55 10.8	-702.2	61.31	14 48.4	54 13.8	II. S.
25	18 44.45	1.708	11 5 13.11	112.63	+0 9 43.2	-721.5	61.27	14 51.1	54 23.7	II. S.
26	19 25.84	1.748	11 50 39.72	115.02	-4 39 7.8	-718.7	61.90	14 56.7	54 44.3	II. S.
27	20 8.68	1.830	12 37 34.20	119.93	-9 21 49.1	-690.0	63.18	15 4.9	55 14.3	II. S.
28	20 53.95	1.949	13 26 54.41	127.11	-13 46 45.4	-628.7	65.03	15 15.1	55 51.8	II. S.
29	21 42.46	2.097	14 19 29.30	136.00	-17 39 24.1	-527.1	67.28	15 26.6	56 34.1	II. S.
30	22 34.66	2.252	15 15 46.56	145.36	-20 42 12.1	-378.9	69.59	15 38.5	57 17.8	II. S.
Dec. 1	23 30.39	2.385	16 15 36.16	153.33	-22 36 19.1	-184.7	71.51	15 49.8	57 59.4	II. N.
3	0 28.67	2.459	17 17 58.55	157.81	-23 5 29.6	+42.5	72.59	15 59.6	58 35.3	I. N.
4	1 27.81	2.457	18 21 13.40	157.65	-22 1 12.6	277.7	72.60	16 7.2	59 3.0	I. S.
5	2 26.04	2.387	19 23 33.39	153.47	-19 26 7.6	492.0	71.65	16 12.0	59 20.8	I. S.
6	3 22.11	2.283	20 23 43.21	147.18	-15 33 24.4	663.2	70.17	16 14.2	59 28.7	I. S.
7	4 15.61	2.179	21 21 18.69	140.92	-10 42 41.6	+781.2	68.67	16 13.9	59 27.9	I. S.
8	5 6.90	2.101	22 16 40.95	136.28	-5 15 40.6	845.0	67.52	16 11.8	59 20.0	I. S.
9	5 56.79	2.063	23 10 39.00	133.99	+0 26 33.4	857.9	66.95	16 8.1	59 6.6	I. S.
10	6 46.27	2.068	0 4 12.97	134.26	6 4 21.4	823.4	67.00	16 3.4	58 49.2	I. S.
11	7 36.33	2.109	0 58 20.97	136.73	11 19 14.2	743.6	67.59	15 57.7	58 28.4	I. S.
12	8 27.69	2.174	1 53 47.48	140.63	+15 53 31.1	+620.8	68.52	15 51.4	58 4.9	I. S.
13	9 20.67	2.240	2 50 51.93	144.65	19 30 40.9	459.1	69.46	15 44.2	57 38.5	I. S.
14	10 15.03	2.283	3 49 18.88	147.23	21 56 53.5	268.1	70.05	15 36.2	57 9.4	I. S.
15	11 9.90	2.280	4 48 16.82	147.05	23 3 20.0	+63.4	69.96	15 27.7	56 38.2	I. S.
16	12 4.06	2.224	5 46 31.64	143.66	22 48 21.6	-135.7	69.11	15 18.9	56 5.8	II. S.
17	12 56.31	2.124	6 42 51.55	137.67	+21 17 47.8	-312.2	67.62	15 10.3	55 34.0	II. S.
18	13 45.87	2.004	7 36 29.92	130.45	18 42 58.8	-456.0	65.81	15 2.2	55 4.4	II. S.
19	14 32.54	1.887	8 27 14.35	123.39	15 17 44.6	-564.4	64.01	14 55.4	54 39.4	II. S.
20	15 16.61	1.790	9 15 22.41	117.56	11 15 46.1	-640.4	62.50	14 50.3	54 20.7	II. S.
21	15 58.71	1.724	10 1 32.11	113.59	6 49 10.6	-688.3	61.47	14 47.5	54 10.5	II. S.
22	16 39.67	1.696	10 46 33.11	111.87	+2 8 17.0	-712.4	61.04	14 47.4	54 10.0	II. S.
23	17 20.42	1.707	11 31 21.28	112.56	-2 37 52.6	-714.8	61.26	14 50.1	54 20.1	II. S.
24	18 1.94	1.760	12 16 55.96	115.76	-7 20 35.7	-694.8	62.16	14 55.9	54 41.4	II. S.
25	18 45.25	1.855	13 4 17.82	121.48	-11 50 17.9	-648.8	63.70	15 4.7	55 13.5	II. S.
26	19 31.30	1.988	13 54 25.22	129.49	-15 55 19.7	-570.2	65.79	15 16.0	55 55.2	II. S.
27	20 20.91	2.148	14 48 6.23	139.12	-19 20 59.8	-450.7	68.21	15 29.5	56 44.5	II. S.
28	21 14.45	2.312	15 45 44.29	148.93	-21 49 36.7	-284.4	70.59	15 43.9	57 37.7	II. S.
29	22 11.61	2.444	16 47 0.05	156.86	-23 2 27.8	-73.2	72.46	15 58.4	58 30.8	II. S.
30	23 11.20	2.509	17 50 41.33	160.78	-22 44 20.5	+166.5	73.35	16 11.3	59 18.3	

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	22 40.1	17 24 22.09	-20 13 36.9	11.0	4.3	0.30	Feb. 15	23 43.6	21 29 25.78	-17 2 45.7	6.4	2.4	0.17
1	22 36.6	17 24 51.90	20 19 49.3	10.7	4.2	0.29	16	23 46.4	21 36 14.37	16 30 34.2	6.4	2.4	0.17
2	22 33.7	17 25 56.29	20 27 22.9	10.5	4.0	0.28	17	23 49.3	21 43 3.88	15 56 57.9	6.4	2.4	0.17
3	22 31.4	17 27 32.42	20 36 2.8	10.2	3.9	0.28	18	23 52.2	21 49 54.30	15 21 56.9	6.4	2.4	0.17
4	22 29.5	17 29 37.49	20 45 34.7	9.9	3.8	0.27	19	23 55.1	21 56 45.64	14 45 31.4	6.4	2.4	0.17
5	22 28.1	17 32 8.84	-20 55 45.0	9.7	3.7	0.26	20	23 58.0	22 3 37.88	-14 7 41.7	6.4	2.4	0.17
6	22 27.1	17 35 3.97	21 6 21.2	9.5	3.6	0.26	22	0 1.0	22 10 31.02	13 28 28.4	6.4	2.4	0.16
7	22 26.5	17 38 20.60	21 17 11.7	9.3	3.5	0.25	23	0 3.9	22 17 25.07	12 47 51.9	6.4	2.4	0.16
8	22 26.2	17 41 56.64	21 28 6.1	9.2	3.4	0.25	24	0 6.9	22 24 20.02	12 5 52.9	6.4	2.4	0.16
9	22 26.1	17 45 50.20	21 38 54.9	9.0	3.4	0.24	25	0 9.8	22 31 15.85	11 22 32.5	6.4	2.4	0.16
10	22 26.3	17 49 59.56	-21 49 29.5	8.8	3.3	0.24	26	0 12.9	22 38 12.51	-10 37 52.1	6.5	2.5	0.16
11	22 26.7	17 54 23.19	21 59 42.3	8.7	3.3	0.24	27	0 15.8	22 45 9.97	9 51 53.3	6.5	2.5	0.16
12	22 27.4	17 58 59.74	22 9 26.5	8.5	3.2	0.23	28	0 18.8	22 52 8.13	9 4 38.1	6.5	2.5	0.16
13	22 28.3	18 3 47.98	22 18 36.1	8.4	3.2	0.23	Mar. 1	0 21.9	22 59 6.90	8 16 8.8	6.5	2.5	0.17
14	22 29.3	18 8 46.82	22 27 6.3	8.2	3.1	0.22	2	0 24.9	23 6 6.13	7 26 28.7	6.6	2.5	0.17
15	22 30.5	18 13 55.27	-22 34 52.1	8.1	3.1	0.22	3	0 27.9	23 13 5.61	-6 35 41.4	6.6	2.5	0.17
16	22 31.8	18 19 12.46	22 41 49.0	8.0	3.0	0.22	4	0 31.0	23 20 5.07	5 43 51.0	6.7	2.6	0.17
17	22 33.3	18 24 37.63	22 47 53.2	7.9	3.0	0.21	5	0 34.0	23 27 4.28	4 51 3.0	6.7	2.6	0.17
18	22 34.9	18 30 10.07	22 53 1.5	7.8	2.9	0.21	6	0 37.0	23 34 2.75	3 57 23.3	6.8	2.6	0.17
19	22 36.6	18 35 49.13	22 57 11.0	7.7	2.9	0.21	7	0 40.0	23 41 0.00	3 2 59.1	6.8	2.6	0.17
20	22 38.4	18 41 34.24	-23 0 18.9	7.5	2.8	0.20	8	0 43.0	23 47 55.47	-2 7 58.6	6.9	2.6	0.17
21	22 40.3	18 47 24.89	23 2 22.8	7.4	2.8	0.20	9	0 46.0	23 54 48.42	1 12 31.2	7.0	2.7	0.18
22	22 42.3	18 53 20.65	23 3 20.6	7.3	2.8	0.20	10	0 48.9	0 1 38.07	-0 16 47.8	7.1	2.7	0.18
23	22 44.3	18 59 21.09	23 3 10.3	7.3	2.7	0.20	11	0 51.7	0 8 23.46	+0 39 0.1	7.2	2.7	0.18
24	22 46.5	19 5 25.83	23 1 50.0	7.2	2.7	0.20	12	0 54.4	0 15 3.52	1 34 39.5	7.3	2.7	0.18
25	22 48.7	19 11 34.50	-22 59 18.3	7.1	2.7	0.20	13	0 56.9	0 21 37.03	+2 29 56.0	7.4	2.8	0.19
26	22 51.0	19 17 46.80	22 55 33.8	7.0	2.7	0.19	14	0 59.4	0 28 2.71	3 24 34.4	7.6	2.8	0.19
27	22 53.3	19 24 2.43	22 50 34.9	7.0	2.7	0.19	15	1 1.8	0 34 19.16	4 18 19.4	7.7	2.9	0.19
28	22 55.6	19 30 21.13	22 44 20.6	6.9	2.6	0.19	16	1 4.0	0 40 24.85	5 10 54.6	7.9	2.9	0.20
29	22 58.0	19 36 42.68	22 36 49.9	6.9	2.6	0.19	17	1 6.0	0 46 18.25	6 2 3.5	8.1	3.0	0.20
30	23 0.4	19 43 6.84	-22 28 1.6	6.8	2.6	0.19	18	1 7.7	0 51 57.79	+6 51 29.4	8.3	3.1	0.21
31	23 2.9	19 49 33.38	22 17 55.0	6.8	2.6	0.19	19	1 9.1	0 57 21.89	7 38 56.5	8.5	3.2	0.21
Feb. 1	23 5.5	19 56 2.15	22 6 29.3	6.7	2.6	0.19	20	1 10.2	1 2 28.98	8 24 9.7	8.8	3.3	0.22
2	23 8.1	20 2 32.98	21 53 43.7	6.7	2.5	0.18	21	1 11.1	1 7 17.59	9 6 54.4	9.0	3.4	0.22
3	23 10.7	20 9 5.69	21 39 37.4	6.7	2.5	0.18	22	1 11.6	1 11 46.31	9 46 57.3	9.2	3.5	0.23
4	23 13.3	20 15 40.16	-21 24 10.0	6.6	2.5	0.18	23	1 11.8	1 15 53.83	+10 24 6.1	9.5	3.6	0.23
5	23 16.0	20 22 16.22	21 7 20.8	6.6	2.5	0.18	24	1 11.6	1 19 38.93	10 58 9.6	9.8	3.7	0.24
6	23 18.6	20 28 53.77	20 49 9.3	6.6	2.5	0.18	25	1 11.1	1 23 0.60	11 28 57.9	10.1	3.8	0.25
7	23 21.3	20 35 32.72	20 29 35.2	6.6	2.5	0.18	26	1 10.1	1 25 57.95	11 56 22.1	10.4	3.9	0.26
8	23 24.0	20 42 12.99	20 8 38.2	6.5	2.4	0.17	27	1 8.7	1 28 30.27	12 20 14.6	10.7	4.0	0.27
9	23 26.8	20 48 54.49	-19 46 17.5	6.5	2.4	0.17	28	1 6.9	1 30 36.98	+12 40 28.2	11.0	4.1	0.28
10	23 29.5	20 55 37.11	19 22 33.0	6.5	2.4	0.17	29	1 4.6	1 32 17.78	12 56 57.8	11.4	4.2	0.29
11	23 32.3	21 2 20.83	18 57 24.4	6.5	2.4	0.17	30	1 1.9	1 33 32.58	13 9 38.5	11.7	4.3	0.30
12	23 35.1	21 9 5.61	18 30 51.6	6.4	2.4	0.17	31	0 58.8	1 34 21.52	13 18 27.2	12.1	4.5	0.31
13	23 37.9	21 15 51.38	18 2 54.4	6.4	2.4	0.17	32	0 55.3	1 34 45.00	13 23 22.1	12.4	4.6	0.32
14	23 40.7	21 22 38.12	-17 33 32.4	6.4	2.4	0.17	33	0 51.3	1 34 43.76	+13 24 22.8	12.7	4.7	0.33
15	23 43.6	21 29 25.78	-17 2 45.7	6.4	2.4	0.17	34	0 47.0	1 34 18.77	+13 21 31.2	13.0	4.9	0.34

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	0 55.3	1 34 45.00	+13 23 22.1	12.4	4.6	0.32	May 16	22 22.2	2 2 39.31	+9 11 36.2	9.3	3.5	0.24
2	0 51.3	1 34 43.76	13 24 22.8	12.7	4.7	0.33	17	22 23.3	2 7 38.84	9 42 1.7	9.1	3.5	0.23
3	0 47.0	1 34 18.77	13 21 31.2	13.0	4.9	0.34	18	22 24.5	2 12 48.18	10 13 29.3	9.0	3.4	0.23
4	0 42.3	1 33 31.34	13 14 51.1	13.4	5.0	0.34	19	22 25.8	2 18 7.38	10 45 54.5	8.8	3.4	0.22
5	0 37.2	1 32 23.11	13 4 29.1	13.7	5.2	0.35	20	22 27.3	2 23 36.54	11 19 12.5	8.7	3.3	0.22
6	0 31.7	1 30 56.04	+12 50 34.6	14.0	5.3	0.36	21	22 29.0	2 29 15.79	+11 53 18.8	8.6	3.2	0.22
7	0 26.0	1 29 12.39	12 33 20.0	14.2	5.4	0.37	22	22 30.9	2 35 5.27	12 28 8.9	8.4	3.2	0.22
8	0 20.2	1 27 14.60	12 13 0.6	14.5	5.5	0.37	23	22 33.0	2 41 5.21	13 3 37.5	8.3	3.1	0.21
9	0 14.2	1 25 5.47	11 49 55.4	14.7	5.5	0.38	24	22 35.2	2 47 15.81	13 39 39.4	8.1	3.1	0.21
10	0 8.0	1 22 47.85	11 24 25.8	14.9	5.6	0.38	25	22 37.6	2 53 37.25	14 16 9.3	8.0	3.0	0.21
11	0 1.7	1 20 24.71	+10 56 55.9	15.1	5.7	0.39	26	22 40.2	3 0 9.79	+14 53 1.4	7.9	3.0	0.21
11	23 55.3	1 17 59.06	10 27 52.2	15.2	5.7	0.39	27	22 43.0	3 6 53.71	15 30 8.9	7.7	2.9	0.21
12	23 49.0	1 15 33.84	9 57 42.3	15.3	5.7	0.39	28	22 46.0	3 13 49.21	16 7 25.0	7.6	2.9	0.20
13	23 42.7	1 13 11.87	9 26 53.6	15.3	5.8	0.39	29	22 49.2	3 20 56.53	16 44 42.5	7.5	2.8	0.20
14	23 36.5	1 10 55.80	8 55 54.6	15.4	5.8	0.39	30	22 52.5	3 28 15.91	17 21 53.6	7.4	2.8	0.20
15	23 30.4	1 8 48.04	+8 25 12.8	15.4	5.8	0.39	31	22 56.1	3 35 47.49	+17 58 49.6	7.3	2.8	0.20
16	23 24.5	1 6 50.70	7 55 13.1	15.3	5.7	0.39	June 1	22 59.9	3 43 31.40	18 35 21.3	7.2	2.7	0.20
17	23 18.8	1 5 5.63	7 26 19.2	15.3	5.7	0.38	2	23 3.9	3 51 27.66	19 11 18.6	7.1	2.7	0.19
18	23 13.4	1 3 34.35	6 58 51.6	15.2	5.7	0.38	3	23 8.1	3 59 36.23	19 46 30.9	7.1	2.7	0.19
19	23 8.2	1 2 18.10	6 33 8.5	15.0	5.6	0.38	4	23 12.4	4 7 56.93	20 20 47.1	7.0	2.6	0.19
20	23 3.3	1 1 17.80	+6 9 25.2	14.8	5.6	0.38	5	23 17.0	4 16 29.50	+20 53 55.2	7.0	2.6	0.19
21	22 58.6	1 0 34.10	5 47 54.0	14.6	5.5	0.37	6	23 21.8	4 25 13.43	21 25 42.8	6.9	2.6	0.19
22	22 54.2	1 0 7.40	5 28 43.7	14.4	5.4	0.37	7	23 26.8	4 34 8.19	21 55 58.5	6.9	2.5	0.18
23	22 50.1	0 59 57.94	5 12 1.4	14.2	5.4	0.36	8	23 31.9	4 43 12.94	22 24 28.6	6.9	2.5	0.18
24	22 46.3	1 0 5.72	4 57 51.7	14.0	5.3	0.36	9	23 37.2	4 52 26.71	22 51 1.5	6.8	2.5	0.18
25	22 42.8	1 0 30.59	+4 46 17.0	13.8	5.2	0.35	10	23 42.6	5 1 48.36	+23 15 25.5	6.8	2.5	0.18
26	22 39.5	1 1 12.31	4 37 17.8	13.6	5.1	0.34	11	23 48.1	5 11 16.56	23 37 30.0	6.8	2.5	0.18
27	22 36.5	1 2 10.52	4 30 53.6	13.3	5.0	0.34	12	23 53.7	5 20 49.91	23 57 5.4	6.7	2.5	0.18
28	22 33.8	1 3 24.79	4 27 2.4	13.1	4.9	0.33	13	23 59.3	5 30 26.86	24 14 3.4	6.7	2.5	0.18
29	22 31.4	1 4 54.63	4 25 41.5	12.8	4.9	0.33	15	0 5.0	5 40 5.80	24 28 18.1	6.7	2.5	0.18
30	22 29.2	1 6 39.53	+4 26 47.0	12.6	4.8	0.32	16	0 10.7	5 49 45.04	+24 39 44.8	6.7	2.5	0.18
May 1	22 27.2	1 8 38.99	4 30 14.9	12.4	4.7	0.32	17	0 16.4	5 59 22.98	24 48 21.1	6.7	2.5	0.18
2	22 25.5	1 10 52.52	4 36 0.8	12.1	4.6	0.31	18	0 22.0	6 8 58.08	24 54 6.1	6.8	2.5	0.19
3	22 24.0	1 13 19.56	4 43 59.9	11.9	4.5	0.30	19	0 27.6	6 18 28.84	24 57 0.8	6.8	2.5	0.19
4	22 22.8	1 15 59.62	4 54 6.3	11.7	4.4	0.30	20	0 33.1	6 27 53.90	24 57 7.8	6.8	2.6	0.19
5	22 21.8	1 18 52.23	+5 6 15.9	11.5	4.3	0.29	21	0 38.4	6 37 12.05	+24 54 31.4	6.9	2.6	0.19
6	22 21.0	1 21 56.95	5 20 23.2	11.3	4.2	0.28	22	0 43.6	6 46 22.20	24 49 16.8	6.9	2.6	0.19
7	22 20.3	1 25 13.37	5 36 23.2	11.0	4.1	0.28	23	0 48.7	6 55 23.41	24 41 30.4	6.9	2.6	0.19
8	22 19.8	1 28 41.11	5 54 10.9	10.8	4.0	0.27	24	0 53.6	7 4 14.90	24 31 19.3	7.0	2.6	0.19
9	22 19.5	1 32 19.86	6 13 41.4	10.6	4.0	0.27	25	0 58.3	7 12 56.05	24 18 50.9	7.0	2.6	0.19
10	22 19.4	1 36 9.31	+6 34 49.8	10.4	3.9	0.26	26	1 2.9	7 21 26.32	+24 4 13.3	7.1	2.7	0.19
11	22 19.5	1 40 9.21	6 57 31.3	10.2	3.9	0.26	27	1 7.2	7 29 45.33	23 47 34.5	7.1	2.7	0.20
12	22 19.7	1 44 19.33	7 21 41.3	10.0	3.8	0.25	28	1 11.4	7 37 52.78	23 29 2.4	7.2	2.7	0.20
13	22 20.1	1 48 39.50	7 47 15.3	9.8	3.7	0.25	29	1 15.3	7 45 48.46	23 8 45.2	7.3	2.7	0.20
14	22 20.6	1 53 9.61	8 14 8.6	9.6	3.7	0.24	30	1 19.2	7 53 32.24	22 46 51.1	7.4	2.8	0.20
15	22 21.3	1 57 49.57	+8 42 17.0	9.5	3.6	0.24	31	1 22.7	8 1 4.05	+22 23 27.8	7.5	2.8	0.20
16	22 22.2	2 2 39.31	+9 11 36.2	9.3	3.5	0.24	32	1 26.0	8 8 23.86	+21 58 43.1	7.6	2.9	0.20

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	1 22.7	8 1 4.05	+22 23 27.8	7.5	2.8	0.20	Aug. 16	0 16.2	9 55 44.34	+7 35 21.6	14.4	5.5	0.37
2	1 26.0	8 8 23.86	21 58 43.1	7.6	2.9	0.20	17	0 9.2	9 52 37.76	7 56 56.5	14.3	5.5	0.36
3	1 29.3	8 15 31.70	21 32 43.9	7.7	2.9	0.21	18	0 2.1	9 49 30.16	8 20 26.1	14.3	5.4	0.36
4	1 32.2	8 22 27.62	21 5 37.4	7.8	3.0	0.21	18	23 55.1	9 46 25.12	8 45 28.7	14.3	5.4	0.36
5	1 35.0	8 29 11.68	20 37 30.6	7.9	3.0	0.21	19	23 48.2	9 43 26.51	9 11 40.3	14.1	5.4	0.35
6	1 37.7	8 35 43.95	+20 8 30.1	8.0	3.0	0.21	20	23 41.5	9 40 38.13	+9 38 35.4	13.9	5.3	0.35
7	1 40.1	8 42 4.52	19 38 42.2	8.1	3.1	0.21	21	23 34.9	9 38 3.75	10 5 47.7	13.7	5.2	0.35
8	1 42.2	8 48 13.45	19 8 13.0	8.3	3.1	0.22	22	23 28.7	9 35 46.93	10 32 50.0	13.5	5.1	0.34
9	1 44.2	8 54 10.85	18 37 8.4	8.4	3.2	0.22	23	23 22.9	9 33 51.01	10 59 15.9	13.2	5.0	0.34
10	1 46.1	8 59 56.79	18 5 34.2	8.5	3.2	0.22	24	23 17.5	9 32 19.04	11 24 39.6	12.9	4.9	0.33
11	1 47.7	9 5 31.29	+17 33 36.0	8.6	3.2	0.22	25	23 12.5	9 31 13.55	+11 48 37.4	12.6	4.8	0.33
12	1 49.1	9 10 54.39	17 1 19.3	8.8	3.3	0.23	26	23 7.9	9 30 36.70	12 10 47.0	12.3	4.6	0.32
13	1 50.4	9 16 6.13	16 28 49.4	8.9	3.3	0.23	27	23 3.9	9 30 30.21	12 30 48.2	12.0	4.5	0.31
14	1 51.4	9 21 6.50	15 56 11.3	9.1	3.4	0.23	28	23 0.4	9 30 55.29	12 48 22.7	11.7	4.4	0.30
15	1 52.3	9 25 55.49	15 23 30.5	9.2	3.4	0.24	29	22 57.4	9 31 52.66	13 3 15.0	11.4	4.3	0.29
16	1 53.0	9 30 33.01	+14 50 52.1	9.4	3.5	0.24	30	22 54.9	9 33 22.60	+13 15 11.5	11.0	4.2	0.28
17	1 53.5	9 34 59.00	14 18 21.2	9.5	3.5	0.25	31	22 53.0	9 35 24.92	13 24 0.4	10.7	4.0	0.28
18	1 53.8	9 39 13.37	13 46 2.9	9.7	3.6	0.25	Sept. 1	22 51.7	9 37 59.14	13 29 32.2	10.3	3.9	0.27
19	1 53.9	9 43 15.96	13 14 2.5	9.8	3.6	0.26	2	22 50.9	9 41 4.26	13 31 39.4	10.0	3.8	0.26
20	1 53.8	9 47 6.58	12 42 25.3	10.0	3.7	0.26	3	22 50.5	9 44 38.91	13 30 17.1	9.7	3.7	0.25
21	1 53.5	9 50 45.00	+12 11 16.8	10.2	3.8	0.26	4	22 50.5	9 48 41.55	+13 25 21.8	9.4	3.6	0.24
22	1 53.0	9 54 11.00	11 40 42.6	10.3	3.9	0.27	5	22 51.0	9 53 10.39	13 16 52.9	9.2	3.5	0.24
23	1 52.3	9 57 24.28	11 10 48.3	10.5	3.9	0.27	6	22 52.0	9 58 3.30	13 4 51.9	8.9	3.4	0.23
24	1 51.3	10 0 24.54	10 41 39.7	10.7	4.0	0.28	7	22 53.3	10 3 18.05	12 49 22.0	8.6	3.3	0.22
25	1 50.1	10 3 11.41	10 13 23.1	10.9	4.1	0.28	8	22 54.9	10 8 52.26	12 30 28.9	8.4	3.2	0.22
26	1 48.7	10 5 44.50	+9 46 5.0	11.1	4.2	0.28	9	22 56.8	10 14 43.57	+12 8 20.7	8.2	3.1	0.21
27	1 47.1	10 8 3.39	9 19 52.1	11.3	4.3	0.29	10	22 58.9	10 20 49.57	11 43 6.6	8.0	3.1	0.21
28	1 45.3	10 10 7.62	8 54 51.1	11.5	4.3	0.29	11	23 1.3	10 27 7.90	11 14 58.3	7.9	3.0	0.20
29	1 43.2	10 11 56.68	8 31 9.5	11.7	4.4	0.30	12	23 3.9	10 33 36.32	10 44 7.5	7.7	2.9	0.20
30	1 40.8	10 13 30.07	8 8 54.9	11.9	4.5	0.30	13	23 6.6	10 40 12.76	10 10 47.7	7.6	2.8	0.20
31	1 38.1	10 14 47.28	+7 48 15.2	12.1	4.6	0.31	14	23 9.3	10 46 55.27	+9 35 12.6	7.4	2.8	0.19
Aug. 1	1 35.2	10 15 47.79	7 29 18.6	12.3	4.7	0.31	15	23 12.1	10 53 42.16	8 57 36.3	7.3	2.7	0.19
2	1 32.0	10 16 31.09	7 12 13.5	12.5	4.8	0.32	16	23 15.0	11 0 31.91	8 18 12.4	7.1	2.6	0.18
3	1 28.5	10 16 56.67	6 57 8.6	12.7	4.8	0.32	17	23 17.9	11 7 23.17	7 37 14.4	7.0	2.6	0.18
4	1 24.7	10 17 4.11	6 44 12.6	12.9	4.9	0.33	18	23 20.8	11 14 14.82	6 54 55.1	6.9	2.6	0.18
5	1 20.5	10 16 53.04	+6 33 34.2	13.1	5.0	0.33	19	23 23.7	11 21 5.97	+6 11 26.7	6.8	2.5	0.17
6	1 16.1	10 16 23.20	6 25 21.8	13.3	5.0	0.34	20	23 26.6	11 27 55.87	5 27 0.5	6.7	2.5	0.17
7	1 11.4	10 15 34.45	6 19 43.2	13.5	5.1	0.34	21	23 29.4	11 34 43.94	4 41 47.0	6.6	2.5	0.17
8	1 6.3	10 14 26.89	6 16 45.8	13.7	5.1	0.35	22	23 32.3	11 41 29.74	3 55 55.7	6.6	2.5	0.17
9	1 0.9	10 13 0.77	6 16 35.6	13.9	5.2	0.35	23	23 35.1	11 48 12.87	3 9 35.3	6.5	2.5	0.17
10	0 55.3	10 11 16.58	+6 19 17.4	14.1	5.2	0.35	24	23 37.8	11 54 53.11	+2 22 53.7	6.5	2.4	0.16
11	0 49.4	10 9 15.15	6 24 54.0	14.2	5.3	0.36	25	23 40.4	12 1 30.34	1 35 57.9	6.5	2.4	0.16
12	0 43.2	10 6 57.71	6 33 25.9	14.3	5.4	0.36	26	23 43.0	12 8 4.48	0 48 54.3	6.4	2.4	0.16
13	0 36.7	10 4 25.78	6 44 51.4	14.4	5.4	0.37	27	23 45.6	12 14 35.48	+0 1 48.7	6.4	2.4	0.16
14	0 30.0	10 1 41.27	6 59 5.4	14.4	5.5	0.37	28	23 48.1	12 21 3.37	-0 45 13.8	6.4	2.4	0.16
15	0 23.1	9 58 46.54	+7 15 59.5	14.4	5.5	0.37	29	23 50.6	12 27 28.23	-1 32 9.0	6.4	2.4	0.16
16	0 16.2	9 55 44.34	+7 35 21.6	14.4	5.5	0.37	30	23 53.0	12 33 50.15	-2 18 52.7	6.4	2.4	0.16

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	23 55.4	12 40 9.24	3 5 21.0	6.3	2.4	0.16	Nov. 17	1 18.2	17 4 29.81	25 25 8.5	8.9	3.3	0.25
2	23 57.7	12 46 25.65	3 51 30.8	6.3	2.4	0.16	18	1 18.2	17 8 31.09	25 27 8.7	9.1	3.4	0.26
4	0 0.0	12 52 39.52	4 37 19.2	6.3	2.3	0.16	19	1 17.9	17 12 13.31	25 27 30.1	9.3	3.5	0.26
5	0 2.2	12 58 51.00	5 22 43.7	6.3	2.3	0.16	20	1 17.3	17 15 33.84	25 26 10.1	9.6	3.6	0.27
6	0 4.4	13 5 0.26	6 7 42.0	6.2	2.3	0.16	21	1 16.4	17 18 29.84	25 23 5.9	9.8	3.7	0.27
7	0 6.6	13 11 7.45	6 52 11.7	6.2	2.3	0.16	22	1 15.0	17 20 58.18	25 18 14.9	10.0	3.8	0.28
8	0 8.7	13 17 12.76	7 36 10.8	6.2	2.3	0.16	23	1 13.0	17 22 55.58	25 11 33.9	10.3	3.9	0.29
9	0 10.8	13 23 16.35	8 19 37.6	6.2	2.3	0.16	24	1 10.4	17 24 18.72	25 2 59.5	10.5	4.0	0.29
10	0 12.9	13 29 18.36	9 2 30.6	6.3	2.4	0.16	25	1 7.2	17 25 4.18	24 52 28.3	10.8	4.1	0.30
11	0 15.0	13 35 18.95	9 44 47.9	6.3	2.4	0.16	26	1 3.3	17 25 8.76	24 39 56.5	11.1	4.2	0.30
12	0 17.0	13 41 18.28	10 26 28.0	6.3	2.4	0.16	27	0 58.7	17 24 29.65	24 25 20.2	11.4	4.3	0.31
13	0 19.0	13 47 16.49	11 7 29.8	6.3	2.4	0.16	28	0 53.4	17 23 4.73	24 8 36.1	11.6	4.4	0.32
14	0 21.0	13 53 13.73	11 47 51.7	6.3	2.4	0.16	29	0 47.3	17 20 52.93	23 49 42.5	11.9	4.5	0.33
15	0 23.0	13 59 10.15	12 27 32.6	6.4	2.4	0.16	30	0 40.4	17 17 54.63	23 28 40.4	12.2	4.6	0.33
16	0 25.0	14 5 5.86	13 6 31.1	6.4	2.4	0.16	Dec. 1	0 32.8	17 14 11.93	23 5 34.6	12.5	4.7	0.34
17	0 27.0	14 11 0.96	13 44 46.1	6.4	2.4	0.16	2	0 24.5	17 9 49.03	22 40 35.5	12.7	4.8	0.35
18	0 29.0	14 16 55.56	14 22 16.4	6.4	2.4	0.16	3	0 15.6	17 4 52.29	22 14 1.4	12.8	4.8	0.35
19	0 30.9	14 22 49.76	14 59 0.8	6.4	2.4	0.16	4	0 6.3	17 59 30.20	21 46 18.2	12.9	4.8	0.36
20	0 32.9	14 28 43.66	15 34 58.1	6.5	2.4	0.17	4	23 56.8	16 53 52.91	21 18 1.2	13.0	4.9	0.36
21	0 34.8	14 34 37.31	16 10 6.9	6.5	2.4	0.17	5	23 47.2	16 48 11.54	20 49 52.0	13.0	4.9	0.35
22	0 36.7	14 40 30.76	16 44 26.1	6.5	2.4	0.17	6	23 37.7	16 42 37.47	20 22 37.2	12.9	4.9	0.35
23	0 38.7	14 46 24.06	17 17 54.4	6.5	2.5	0.17	7	23 28.5	16 37 21.44	19 57 3.8	12.8	4.8	0.34
24	0 40.6	14 52 17.26	17 50 30.6	6.6	2.5	0.17	8	23 19.8	16 32 32.82	19 33 54.7	12.6	4.7	0.34
25	0 42.6	14 58 10.35	18 22 13.2	6.6	2.5	0.17	9	23 11.6	16 28 19.11	19 13 45.1	12.4	4.7	0.33
26	0 44.5	15 4 3.30	18 53 1.2	6.6	2.5	0.18	10	23 4.1	16 24 45.63	18 57 1.7	12.2	4.6	0.33
27	0 46.5	15 9 56.09	19 22 53.1	6.7	2.5	0.18	11	22 57.4	16 21 55.61	18 43 59.5	11.9	4.5	0.32
28	0 48.4	15 15 48.65	19 51 47.3	6.7	2.5	0.18	12	22 51.3	16 19 50.42	18 34 44.3	11.6	4.4	0.31
29	0 50.3	15 21 40.90	20 19 42.2	6.8	2.5	0.18	13	22 46.0	16 18 29.85	18 29 11.9	11.3	4.3	0.30
30	0 52.2	15 27 32.72	20 46 36.6	6.9	2.6	0.18	14	22 41.5	16 17 52.50	18 27 11.5	11.0	4.2	0.30
31	0 54.1	15 33 23.96	21 12 28.9	6.9	2.6	0.19	15	22 37.6	16 17 56.17	18 28 27.0	10.7	4.1	0.29
Nov. 1	0 56.0	15 39 14.43	21 37 17.5	7.0	2.6	0.19	16	22 34.4	16 18 38.10	18 32 39.3	10.5	4.0	0.28
2	0 57.9	15 45 3.90	22 1 0.6	7.1	2.6	0.19	17	22 31.8	16 19 55.33	18 39 27.5	10.2	3.9	0.27
3	0 59.8	15 50 52.10	22 23 36.6	7.2	2.7	0.19	18	22 29.7	16 21 44.83	18 48 30.1	10.0	3.8	0.27
4	1 1.6	15 56 38.71	22 45 3.6	7.3	2.7	0.19	19	22 28.1	16 24 3.59	18 59 26.3	9.7	3.7	0.26
5	1 3.4	16 2 23.33	23 5 20.0	7.3	2.7	0.20	20	22 26.9	16 26 48.77	19 11 56.3	9.5	3.6	0.26
6	1 5.1	16 8 5.53	23 24 23.9	7.4	2.8	0.20	21	22 26.1	16 29 57.73	19 25 41.3	9.2	3.5	0.25
7	1 6.8	16 13 44.78	23 42 13.4	7.5	2.8	0.20	22	22 25.6	16 33 28.03	19 40 24.4	9.0	3.5	0.24
8	1 8.4	16 19 20.49	23 58 46.8	7.6	2.8	0.20	23	22 25.5	16 37 17.49	19 55 50.4	8.8	3.4	0.24
9	1 10.0	16 24 51.99	24 14 2.0	7.7	2.9	0.21	24	22 25.7	16 41 24.13	20 11 45.2	8.7	3.3	0.23
10	1 11.5	16 30 18.48	24 27 57.0	7.8	2.9	0.21	25	22 26.1	16 45 46.22	20 27 56.2	8.5	3.3	0.23
11	1 13.0	16 35 39.04	24 40 29.9	8.0	3.0	0.22	26	22 26.7	16 50 22.18	20 44 12.8	8.3	3.2	0.22
12	1 14.3	16 40 52.65	24 51 38.7	8.1	3.0	0.22	27	22 27.6	16 55 10.60	21 0 24.9	8.2	3.2	0.22
13	1 15.4	16 45 58.16	25 1 21.3	8.3	3.1	0.23	28	22 28.7	17 0 10.30	21 16 24.0	8.0	3.1	0.21
14	1 16.4	16 50 54.23	25 9 35.9	8.4	3.1	0.23	29	22 29.9	17 5 20.20	21 32 2.5	7.9	3.0	0.21
15	1 17.3	16 55 39.37	25 16 19.6	8.6	3.2	0.24	30	22 31.3	17 10 39.34	21 47 13.7	7.8	3.0	0.20
16	1 17.9	17 0 11.86	25 21 31.4	8.7	3.2	0.24	31	22 32.8	17 16 6.84	22 1 51.4	7.7	2.9	0.20
17	1 18.2	17 4 29.81	25 25 8.5	8.9	3.3	0.25	32	22 34.4	17 21 41.99	22 15 50.1	7.6	2.9	0.20

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	21 27.4	16 11 29.00	-16 35 33.3	23.2	22.4	1.54	Feb. 15	21 1.5	18 47 0.35	-20 0 11.2	12.4	11.9	0.84
1	21 25.1	16 13 8.21	16 36 38.3	23.0	22.1	1.52	16	21 2.0	18 51 27.44	19 59 30.5	12.2	11.8	0.83
2	21 22.9	16 14 54.54	16 38 21.2	22.9	21.7	1.50	17	21 2.6	18 55 55.79	19 58 22.0	12.1	11.6	0.83
3	21 20.8	16 16 47.77	16 40 39.3	22.7	21.4	1.48	18	21 3.1	19 0 25.31	19 56 45.2	11.9	11.5	0.82
4	21 18.9	16 18 47.67	16 43 30.2	22.6	21.0	1.46	19	21 3.7	19 4 55.94	19 54 39.5	11.8	11.4	0.81
5	21 17.1	16 20 54.01	-16 46 51.4	21.4	20.7	1.44	20	21 4.3	19 9 27.61	-19 52 4.6	11.7	11.3	0.80
6	21 15.4	16 23 6.56	16 50 40.9	21.1	20.4	1.42	21	21 4.9	19 14 0.26	19 49 0.2	11.5	11.2	0.79
7	21 14.8	16 25 25.13	16 54 56.2	20.8	20.0	1.40	22	21 5.5	19 18 33.82	19 45 25.9	11.4	11.1	0.79
8	21 12.3	16 27 49.50	16 59 35.0	20.5	19.7	1.38	23	21 6.1	19 23 8.23	19 41 21.5	11.3	11.0	0.78
9	21 10.8	16 30 19.47	17 4 35.2	20.2	19.4	1.36	24	21 6.7	19 27 43.42	19 36 46.8	11.2	10.9	0.77
10	21 9.4	16 32 54.82	-17 9 54.5	19.8	19.1	1.34	25	21 7.4	19 32 19.33	-19 31 41.4	11.1	10.8	0.76
11	21 8.1	16 35 35.37	17 15 30.9	19.5	18.8	1.32	26	21 8.1	19 36 55.90	19 26 5.3	11.0	10.7	0.75
12	21 7.0	16 38 20.96	17 21 22.4	19.2	18.5	1.30	27	21 8.8	19 41 33.07	19 19 58.2	10.9	10.6	0.75
13	21 5.9	16 41 11.41	17 27 27.1	18.9	18.3	1.28	28	21 9.5	19 46 10.76	19 13 20.1	10.8	10.5	0.74
14	21 4.9	16 44 6.56	17 33 42.9	18.6	18.0	1.26	Mar. 1	21 10.2	19 50 48.93	19 6 10.9	10.7	10.4	0.73
15	21 3.9	16 47 6.27	-17 40 8.0	18.3	17.7	1.24	2	21 10.9	19 55 27.50	-18 58 30.6	10.6	10.3	0.73
16	21 3.0	16 50 10.39	17 46 40.7	18.0	17.5	1.22	3	21 11.6	20 0 6.42	18 50 19.1	10.5	10.2	0.72
17	21 2.2	16 53 18.76	17 53 19.0	17.8	17.2	1.21	4	21 12.3	20 4 45.63	18 41 36.6	10.4	10.1	0.71
18	21 1.5	16 56 31.27	18 0 1.3	17.5	17.0	1.19	5	21 13.0	20 9 25.07	18 32 23.1	10.3	10.0	0.71
19	21 0.8	16 59 47.78	18 6 45.9	17.3	16.7	1.18	6	21 13.7	20 14 4.68	18 22 38.7	10.2	9.9	0.70
20	21 0.2	17 3 8.18	-18 13 31.0	17.0	16.5	1.16	7	21 14.4	20 18 44.40	-18 12 23.5	10.1	9.8	0.69
21	20 59.7	17 6 32.34	18 20 15.2	16.8	16.3	1.14	8	21 15.1	20 23 24.18	18 1 37.8	10.0	9.7	0.68
22	20 59.2	17 10 0.15	18 26 56.9	16.6	16.1	1.13	9	21 15.9	20 28 3.98	17 50 21.7	10.0	9.7	0.68
23	20 58.8	17 13 31.51	18 33 34.6	16.3	15.8	1.11	10	21 16.6	20 32 43.72	17 38 35.5	9.9	9.6	0.67
24	20 58.5	17 17 6.29	18 40 6.8	16.1	15.6	1.10	11	21 17.3	20 37 23.37	17 26 19.4	9.8	9.5	0.66
25	20 58.2	17 20 44.40	-18 46 32.0	15.9	15.4	1.08	12	21 18.0	20 42 2.90	-17 13 33.7	9.7	9.4	0.65
26	20 57.9	17 24 25.75	18 52 48.8	15.7	15.2	1.07	13	21 18.8	20 46 42.27	17 0 18.7	9.6	9.3	0.65
27	20 57.8	17 28 10.23	18 58 55.9	15.5	15.0	1.05	14	21 19.5	20 51 21.44	16 46 34.6	9.6	9.3	0.64
28	20 57.6	17 31 57.74	19 4 52.1	15.3	14.8	1.04	15	21 20.2	20 56 0.36	16 32 21.8	9.5	9.2	0.64
29	20 57.5	17 35 48.18	19 10 36.1	15.1	14.6	1.03	16	21 20.9	21 0 39.01	16 17 40.6	9.4	9.1	0.63
30	20 57.4	17 39 41.44	-19 16 6.7	14.9	14.4	1.02	17	21 21.5	21 5 17.36	-16 2 31.3	9.4	9.0	0.62
31	20 57.4	17 43 37.42	19 21 22.7	14.7	14.2	1.01	18	21 22.2	21 9 55.39	15 46 54.2	9.3	9.0	0.62
Feb. 1	20 57.4	17 47 36.04	19 26 22.9	14.5	14.0	1.00	19	21 22.9	21 14 33.07	15 30 49.8	9.3	8.9	0.61
2	20 57.5	17 51 37.20	19 31 6.3	14.4	13.8	0.99	20	21 23.6	21 19 10.38	15 14 18.5	9.2	8.8	0.60
3	20 57.6	17 55 40.78	19 35 31.9	14.2	13.6	0.97	21	21 24.2	21 23 47.30	14 57 20.7	9.1	8.8	0.60
4	20 57.7	17 59 46.71	-19 39 38.6	14.0	13.5	0.96	22	21 24.9	21 28 23.81	-14 39 56.8	9.0	8.7	0.59
5	20 57.9	18 3 54.88	19 43 25.5	13.8	13.3	0.95	23	21 25.5	21 32 59.89	14 22 7.2	8.9	8.6	0.59
6	20 58.2	18 8 5.22	19 46 51.8	13.7	13.2	0.94	24	21 26.2	21 37 35.53	14 3 52.4	8.9	8.6	0.58
7	20 58.5	18 12 17.60	19 49 56.5	13.5	13.0	0.92	25	21 26.8	21 42 10.74	13 45 12.9	8.8	8.5	0.58
8	20 58.8	18 16 31.96	19 52 38.9	13.4	12.9	0.91	26	21 27.5	21 46 45.50	13 26 9.1	8.7	8.4	0.58
9	20 59.1	18 20 48.19	-19 54 58.2	13.2	12.7	0.90	27	21 28.1	21 51 19.81	-13 6 41.5	8.6	8.4	0.57
10	20 59.4	18 25 6.21	19 56 53.7	13.1	12.6	0.89	28	21 28.7	21 55 53.66	12 46 50.7	8.5	8.3	0.57
11	20 59.8	18 29 25.94	19 58 24.8	12.9	12.4	0.88	29	21 29.3	22 0 27.04	12 26 36.9	8.5	8.3	0.57
12	21 0.2	18 33 47.31	19 59 30.7	12.8	12.3	0.87	30	21 29.9	22 4 59.95	12 6 1.1	8.4	8.2	0.56
13	21 0.6	18 38 10.21	20 0 10.8	12.6	12.1	0.86	31	21 30.5	22 9 32.39	11 45 3.7	8.4	8.2	0.56
14	21 1.0	18 42 34.58	-20 0 24.5	12.5	12.0	0.85	32	21 31.1	22 14 4.35	-11 23 45.2	8.3	8.2	0.56
15	21 1.5	18 47 0.35	-20 0 11.2	12.4	11.9	0.84	33	21 31.7	22 18 35.83	-11 2 6.3	8.3	8.1	0.55



## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	21 31.1	22 14 4.35	-11 23 45.2	8.3	8.2	0.56	May 17	21 53.9	1 38 18.96	+8 17 37.1	6.5	6.3	0.42
2	21 31.7	22 18 35.83	11 2 6.3	8.3	8.1	0.55	18	21 54.5	1 42 49.63	8 43 38.8	6.5	6.3	0.42
3	21 32.3	22 23 6.84	10 40 7.4	8.3	8.1	0.54	19	21 55.1	1 47 20.99	9 9 30.8	6.4	6.2	0.42
4	21 32.9	22 27 37.38	10 17 49.2	8.2	8.0	0.54	20	21 55.7	1 51 53.04	9 35 12.4	6.4	6.2	0.42
5	21 33.5	22 32 7.45	9 55 12.3	8.2	7.9	0.53	21	21 56.3	1 56 25.82	10 0 43.0	6.4	6.2	0.42
6	21 34.0	22 36 37.06	9 32 17.2	8.1	7.9	0.53	22	21 56.9	2 0 59.37	+10 26 1.9	6.4	6.2	0.42
7	21 34.6	22 41 6.21	9 9 4.6	8.1	7.8	0.52	23	21 57.5	2 5 33.72	10 51 8.3	6.3	6.1	0.42
8	21 35.1	22 45 34.91	8 45 35.3	8.0	7.7	0.52	24	21 58.2	2 10 8.90	11 16 1.6	6.3	6.1	0.42
9	21 35.6	22 50 3.17	8 21 49.9	7.9	7.7	0.51	25	21 58.8	2 14 44.94	11 40 41.0	6.3	6.1	0.41
10	21 36.1	22 54 30.99	7 57 48.9	7.9	7.6	0.51	26	21 59.5	2 19 21.86	12 5 5.9	6.3	6.1	0.41
11	21 36.6	22 58 58.39	7 33 32.9	7.9	7.6	0.51	27	22 0.2	2 23 59.69	+12 29 15.6	6.3	6.1	0.41
12	21 37.1	23 3 25.39	7 9 2.6	7.8	7.5	0.51	28	22 1.0	2 28 38.46	12 53 9.5	6.2	6.0	0.41
13	21 37.6	23 7 52.01	6 44 18.5	7.8	7.5	0.50	29	22 1.7	2 33 18.19	13 16 46.8	6.2	6.0	0.41
14	21 38.1	23 12 18.27	6 19 21.3	7.7	7.4	0.50	30	22 2.5	2 37 58.90	13 40 6.8	6.2	6.0	0.41
15	21 38.6	23 16 44.19	5 54 11.7	7.7	7.4	0.50	31	22 3.2	2 42 40.61	14 3 8.7	6.2	6.0	0.41
16	21 39.1	23 21 9.78	5 28 50.3	7.7	7.4	0.49	June 1	22 4.0	2 47 23.34	+14 25 51.7	6.2	5.9	0.41
17	21 39.6	23 25 35.06	5 3 17.6	7.6	7.3	0.49	2	22 4.7	2 52 7.11	14 48 15.2	6.1	5.9	0.41
18	21 40.1	23 30 0.08	4 37 34.3	7.6	7.3	0.49	3	22 5.5	2 56 51.92	15 10 18.6	6.1	5.9	0.41
19	21 40.6	23 34 24.85	4 11 41.0	7.5	7.2	0.48	4	22 6.3	3 1 37.80	15 32 1.2	6.1	5.9	0.41
20	21 41.1	23 38 49.40	3 45 38.2	7.5	7.2	0.48	5	22 7.1	3 6 24.75	15 53 22.1	6.1	5.8	0.41
21	21 41.6	23 43 13.77	3 19 26.6	7.5	7.2	0.48	6	22 7.9	3 11 12.80	+16 14 20.7	6.1	5.8	0.40
22	21 42.1	23 47 37.97	2 53 6.9	7.4	7.1	0.47	7	22 8.8	3 16 1.94	16 34 56.2	6.0	5.8	0.40
23	21 42.6	23 52 2.04	2 26 39.8	7.4	7.1	0.47	8	22 9.7	3 20 52.18	16 55 8.1	6.0	5.8	0.40
24	21 43.0	23 56 26.00	2 0 5.7	7.3	7.0	0.47	9	22 10.6	3 25 43.52	17 14 55.5	6.0	5.8	0.40
25	21 43.4	0 0 49.88	1 33 25.3	7.3	7.0	0.47	10	22 11.5	3 30 35.96	17 34 17.7	6.0	5.7	0.40
26	21 43.8	0 5 13.72	1 6 39.3	7.3	7.0	0.46	11	22 12.5	3 35 29.52	+17 53 14.2	6.0	5.7	0.40
27	21 44.3	0 9 37.55	0 39 48.3	7.2	6.9	0.46	12	22 13.5	3 40 24.18	18 11 44.2	5.9	5.7	0.40
28	21 44.7	0 14 1.39	0 12 52.9	7.2	6.9	0.46	13	22 14.5	3 45 19.95	18 29 47.1	5.9	5.7	0.40
29	21 45.2	0 18 25.28	0 14 6.2	7.1	6.8	0.46	14	22 15.5	3 50 16.83	18 47 22.2	5.9	5.7	0.40
30	21 45.6	0 22 49.26	0 41 8.3	7.1	6.8	0.46	15	22 16.5	3 55 14.82	19 4 28.9	5.9	5.7	0.40
May 1	21 46.1	0 27 13.36	+1 8 12.7	7.1	6.8	0.45	16	22 17.5	4 0 13.90	+19 21 6.5	5.9	5.6	0.40
2	21 46.5	0 31 37.60	1 35 18.9	7.0	6.7	0.45	17	22 18.6	4 5 14.08	19 37 14.3	5.8	5.6	0.40
3	21 47.0	0 36 2.02	2 2 26.1	7.0	6.7	0.45	18	22 19.7	4 10 15.33	19 52 51.8	5.8	5.6	0.40
4	21 47.5	0 40 26.65	2 29 33.8	6.9	6.7	0.45	19	22 20.8	4 15 17.67	20 7 58.4	5.8	5.6	0.40
5	21 48.0	0 44 51.50	2 56 41.1	6.9	6.6	0.44	20	22 21.9	4 20 21.07	20 22 33.4	5.8	5.6	0.40
6	21 48.4	0 49 16.62	+3 23 47.4	6.9	6.6	0.44	21	22 23.0	4 25 25.51	+20 36 36.1	5.8	5.6	0.39
7	21 48.9	0 53 42.04	3 50 52.1	6.8	6.6	0.44	22	22 24.2	4 30 30.97	20 50 6.0	5.7	5.5	0.39
8	21 49.3	0 58 7.77	4 17 54.3	6.8	6.5	0.44	23	22 25.4	4 35 37.43	21 3 2.5	5.7	5.5	0.39
9	21 49.7	1 2 33.84	4 44 53.5	6.7	6.5	0.44	24	22 26.6	4 40 44.87	21 15 25.2	5.7	5.5	0.39
10	21 50.3	1 7 0.31	5 11 49.0	6.7	6.5	0.43	25	22 27.8	4 45 53.28	21 27 13.4	5.7	5.5	0.39
11	21 50.8	1 11 27.20	+5 38 40.1	6.7	6.5	0.43	26	22 29.0	4 51 2.63	+21 38 26.6	5.7	5.5	0.39
12	21 51.3	1 15 54.52	6 5 26.1	6.7	6.4	0.43	27	22 30.2	4 56 12.89	21 49 4.3	5.7	5.5	0.39
13	21 51.8	1 20 22.33	6 32 6.5	6.6	6.4	0.43	28	22 31.4	5 1 24.03	21 59 6.0	5.7	5.4	0.39
14	21 52.3	1 24 50.65	6 58 40.4	6.6	6.4	0.43	29	22 32.7	5 6 36.01	22 8 31.2	5.6	5.4	0.39
15	21 52.8	1 29 19.51	7 25 7.2	6.6	6.4	0.43	30	22 33.9	5 11 48.78	22 17 19.4	5.6	5.4	0.39
16	21 53.4	1 33 48.93	+7 51 26.4	6.6	6.3	0.43	31	22 35.2	5 17 2.31	+22 25 30.2	5.6	5.4	0.39
17	21 53.9	1 38 18.96	+8 17 37.1	6.5	6.3	0.42	32	22 36.5	5 22 16.55	+22 33 3.2	5.6	5.4	0.39

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	22 35.2	5 17 2.31	+22 25 30.2	5.6	5.4	0.39	Aug. 16	23 33.6	9 17 0.60	+16 56 47.5	5.2	5.0	0.35
2	22 36.5	5 22 16.55	22 33 3.2	5.6	5.4	0.39	17	23 34.6	9 21 57.47	16 35 39.9	5.2	5.0	0.35
3	22 37.8	5 27 31.46	22 39 58.1	5.6	5.4	0.39	18	23 35.6	9 26 53.30	16 14 4.5	5.2	5.0	0.35
4	22 39.1	5 32 47.00	22 46 14.5	5.6	5.4	0.39	19	23 36.6	9 31 48.10	15 52 1.9	5.2	5.0	0.35
5	22 40.4	5 38 3.12	22 51 52.0	5.5	5.3	0.39	20	23 37.5	9 36 41.88	15 29 32.7	5.2	5.0	0.35
6	22 41.7	5 43 19.77	+22 56 50.3	5.5	5.3	0.39	21	23 38.5	9 41 34.65	+15 6 37.5	5.2	5.0	0.34
7	22 43.1	5 48 36.89	23 1 9.0	5.5	5.3	0.39	22	23 39.4	9 46 26.41	14 43 17.1	5.2	5.0	0.34
8	22 44.4	5 53 54.44	23 4 48.0	5.5	5.3	0.39	23	23 40.3	9 51 17.18	14 19 32.1	5.2	5.0	0.34
9	22 45.8	5 59 12.37	23 7 47.0	5.5	5.3	0.39	24	23 41.2	9 56 6.97	13 55 23.3	5.2	5.0	0.34
10	22 47.1	6 4 30.61	23 10 5.9	5.5	5.3	0.38	25	23 42.1	10 0 55.81	13 30 51.3	5.2	5.0	0.34
11	22 48.5	6 9 49.12	+23 11 44.3	5.5	5.3	0.38	26	23 42.9	10 5 43.71	+13 5 56.8	5.2	5.0	0.34
12	22 49.8	6 15 7.83	23 12 42.3	5.5	5.3	0.38	27	23 43.8	10 10 30.69	12 40 40.6	5.2	5.0	0.34
13	22 51.2	6 20 26.70	23 12 59.7	5.4	5.3	0.38	28	23 44.6	10 15 16.75	12 15 3.4	5.2	5.0	0.34
14	22 52.6	6 25 45.66	23 12 36.5	5.4	5.3	0.38	29	23 45.4	10 20 1.94	11 49 5.9	5.2	5.0	0.34
15	22 54.0	6 31 4.68	23 11 32.6	5.4	5.2	0.38	30	23 46.2	10 24 46.26	11 22 48.8	5.1	5.0	0.34
16	22 55.3	6 36 23.69	+23 9 47.9	5.4	5.2	0.38	31	23 47.0	10 29 29.75	+10 56 12.7	5.1	5.0	0.34
17	22 56.7	6 41 42.65	23 7 22.4	5.4	5.2	0.38	Sept. 1	23 47.8	10 34 12.44	10 29 18.6	5.1	5.0	0.34
18	22 58.1	6 47 1.50	23 4 16.1	5.4	5.2	0.38	2	23 48.5	10 38 54.35	10 2 7.2	5.1	5.0	0.34
19	22 59.5	6 52 20.18	23 0 29.1	5.4	5.2	0.38	3	23 49.2	10 43 35.49	9 34 39.0	5.1	5.0	0.33
20	23 0.8	6 57 38.65	22 56 1.6	5.3	5.2	0.38	4	23 49.9	10 48 15.90	9 6 55.0	5.1	5.0	0.33
21	23 2.2	7 2 56.85	+22 50 53.5	5.3	5.2	0.37	5	23 50.6	10 52 55.62	+ 8 38 55.9	5.1	5.0	0.33
22	23 3.5	7 8 14.74	22 45 5.0	5.3	5.2	0.37	6	23 51.3	10 57 34.67	8 10 42.3	5.1	5.0	0.33
23	23 4.9	7 13 32.28	22 38 36.2	5.3	5.2	0.37	7	23 52.0	11 2 13.09	7 42 15.1	5.1	5.0	0.33
24	23 6.2	7 18 49.41	22 31 27.4	5.3	5.2	0.37	8	23 52.7	11 6 50.89	7 13 35.0	5.1	5.0	0.33
25	23 7.6	7 24 6.08	22 23 38.7	5.3	5.1	0.37	9	23 53.4	11 11 28.12	6 44 42.7	5.1	5.0	0.33
26	23 8.9	7 29 22.24	+22 15 10.6	5.3	5.1	0.37	10	23 54.1	11 16 4.81	+ 6 15 38.9	5.1	5.0	0.33
27	23 10.2	7 34 37.86	22 6 3.2	5.3	5.1	0.37	11	23 54.7	11 20 40.99	5 46 24.3	5.1	5.0	0.33
28	23 11.5	7 39 52.88	21 56 16.9	5.3	5.1	0.37	12	23 55.4	11 25 16.72	5 16 59.7	5.1	5.0	0.33
29	23 12.8	7 45 7.26	21 45 51.9	5.3	5.1	0.37	13	23 56.0	11 29 52.01	4 47 25.9	5.1	5.0	0.33
30	23 14.1	7 50 20.98	21 34 48.7	5.3	5.1	0.37	14	23 56.7	11 34 26.92	4 17 43.6	5.1	5.0	0.33
31	23 15.4	7 55 33.98	+21 23 7.4	5.3	5.1	0.37	15	23 57.3	11 39 1.47	+ 3 47 53.4	5.1	5.0	0.33
Aug. 1	23 16.6	8 0 46.24	21 10 48.6	5.3	5.1	0.36	16	23 57.9	11 43 35.71	3 17 56.0	5.1	5.0	0.33
2	23 17.8	8 5 57.70	20 57 52.8	5.3	5.1	0.36	17	23 58.5	11 48 9.69	2 47 52.2	5.1	5.0	0.33
3	23 19.0	8 11 8.34	20 44 20.4	5.3	5.1	0.36	18	23 59.2	11 52 43.45	2 17 42.8	5.1	5.0	0.33
4	23 20.2	8 16 18.13	20 30 11.8	5.3	5.1	0.36	19	23 59.8	11 57 17.02	1 47 28.4	5.1	5.0	0.33
5	23 21.4	8 21 27.04	+20 15 27.5	5.3	5.1	0.36	20	0 0.4	12 1 50.45	+ 1 17 9.8	5.1	5.0	0.33
6	23 22.6	8 26 35.03	20 0 8.2	5.2	5.1	0.36	21	0 1.0	12 6 23.79	0 46 47.7	5.1	5.0	0.33
7	23 23.8	8 31 42.10	19 44 14.4	5.2	5.1	0.36	22	0 1.6	12 10 57.08	+ 0 16 22.7	5.1	5.0	0.33
8	23 24.9	8 36 48.20	19 27 46.4	5.2	5.1	0.36	23	0 2.2	12 15 30.37	- 0 14 4.4	5.1	5.0	0.33
9	23 26.1	8 41 53.31	19 10 45.0	5.2	5.0	0.36	24	0 2.8	12 20 3.69	0 44 32.7	5.1	5.0	0.33
10	23 27.2	8 46 57.43	+18 53 10.7	5.2	5.0	0.36	25	0 3.4	12 24 37.08	- 1 15 1.5	5.1	5.0	0.33
11	23 28.3	8 52 0.54	18 35 4.1	5.2	5.0	0.35	26	0 4.0	12 29 10.60	1 45 30.2	5.1	5.0	0.33
12	23 29.4	8 57 2.63	18 16 25.7	5.2	5.0	0.35	27	0 4.6	12 33 44.29	2 15 58.0	5.1	5.0	0.33
13	23 30.4	9 2 3.69	17 57 16.2	5.2	5.0	0.35	28	0 5.2	12 38 18.18	2 46 24.2	5.2	5.0	0.33
14	23 31.5	9 7 3.71	17 37 36.2	5.2	5.0	0.35	29	0 5.9	12 42 52.32	3 16 48.0	5.2	5.0	0.33
15	23 32.5	9 12 2.68	+17 17 26.4	5.2	5.0	0.35	30	0 6.5	12 47 26.75	- 3 47 8.6	5.2	5.0	0.33
16	23 33.6	9 17 0.60	+16 56 47.5	5.2	5.0	0.35	31	0 7.2	12 52 1.52	- 4 17 25.3	5.2	5.0	0.33

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	0 6.5	12 47 26.75	3 47 8.6	5.2	5.0	0.33	Nov. 16	0 50.4	16 32 46.86	22 21 16.0	5.4	5.3	0.38
2	0 7.2	12 52 1.52	4 17 25.3	5.2	5.0	0.33	17	0 51.8	16 38 6.88	22 34 28.7	5.5	5.3	0.38
3	0 7.8	12 56 36.66	4 47 37.2	5.2	5.0	0.33	18	0 53.2	16 43 27.88	22 47 1.8	5.5	5.3	0.38
4	0 8.5	13 1 12.20	5 17 43.7	5.2	5.0	0.33	19	0 54.6	16 48 49.84	22 58 54.6	5.5	5.3	0.38
5	0 9.1	13 5 48.20	5 47 44.0	5.2	5.0	0.33	20	0 56.0	16 54 12.71	23 10 6.8	5.5	5.3	0.38
6	0 9.8	13 10 24.69	6 17 37.2	5.2	5.0	0.33	21	0 57.5	16 59 36.44	23 20 37.6	5.5	5.3	0.39
7	0 10.4	13 15 1.70	6 47 22.7	5.2	5.0	0.33	22	0 58.9	17 5 0.98	23 30 26.5	5.5	5.3	0.39
8	0 11.1	13 19 39.29	7 16 59.6	5.2	5.0	0.34	23	1 0.4	17 10 26.30	23 39 33.3	5.5	5.3	0.39
9	0 11.8	13 24 17.48	7 46 27.1	5.2	5.0	0.34	24	1 1.9	17 15 52.34	23 47 57.4	5.5	5.3	0.39
10	0 12.5	13 28 56.31	8 15 44.5	5.2	5.0	0.34	25	1 3.4	17 21 19.06	23 55 38.4	5.5	5.3	0.39
11	0 13.3	13 33 35.83	8 44 51.1	5.2	5.0	0.34	26	1 4.9	17 26 46.39	24 2 36.0	5.5	5.3	0.39
12	0 14.1	13 38 16.06	9 13 46.1	5.2	5.0	0.34	27	1 6.4	17 32 14.27	24 8 49.7	5.6	5.4	0.39
13	0 14.8	13 42 57.04	9 42 28.6	5.2	5.0	0.34	28	1 7.9	17 37 42.64	24 14 19.3	5.6	5.4	0.39
14	0 15.6	13 47 38.82	10 10 57.9	5.2	5.0	0.34	29	1 9.5	17 43 11.44	24 19 4.4	5.6	5.4	0.40
15	0 16.3	13 52 21.43	10 39 13.1	5.2	5.0	0.34	30	1 11.0	17 48 40.60	24 23 4.8	5.6	5.4	0.40
16	0 17.1	13 57 4.90	11 7 13.6	5.2	5.0	0.34	Dec. 1	1 12.6	17 54 10.06	24 26 20.4	5.6	5.4	0.40
17	0 17.9	14 1 49.28	11 34 58.5	5.2	5.0	0.34	2	1 14.1	17 59 39.75	24 28 50.9	5.6	5.4	0.40
18	0 18.7	14 6 34.58	12 2 27.1	5.2	5.0	0.34	3	1 15.7	18 5 9.60	24 30 36.3	5.6	5.4	0.40
19	0 19.5	14 11 20.85	12 29 38.6	5.2	5.0	0.34	4	1 17.2	18 10 39.54	24 31 36.4	5.6	5.4	0.40
20	0 20.4	14 16 8.11	12 56 32.2	5.2	5.1	0.34	5	1 18.8	18 16 9.50	24 31 51.1	5.6	5.5	0.40
21	0 21.2	14 20 56.40	13 23 7.1	5.2	5.1	0.35	6	1 20.3	18 21 39.41	24 31 20.4	5.7	5.5	0.40
22	0 22.1	14 25 45.75	13 49 22.5	5.2	5.1	0.35	7	1 21.9	18 27 9.19	24 30 4.2	5.7	5.5	0.40
23	0 23.0	14 30 36.19	14 15 17.5	5.3	5.1	0.35	8	1 23.4	18 32 38.77	24 28 2.7	5.7	5.5	0.40
24	0 23.9	14 35 27.74	14 40 51.5	5.3	5.1	0.35	9	1 25.0	18 38 8.10	24 25 15.9	5.7	5.5	0.41
25	0 24.8	14 40 20.43	15 6 3.6	5.3	5.1	0.35	10	1 26.5	18 43 37.10	24 21 44.0	5.7	5.5	0.41
26	0 25.8	14 45 14.28	15 30 52.9	5.3	5.1	0.35	11	1 28.1	18 49 5.68	24 17 27.2	5.7	5.5	0.41
27	0 26.8	14 50 9.31	15 55 18.8	5.3	5.1	0.35	12	1 29.6	18 54 33.80	24 12 25.6	5.7	5.5	0.41
28	0 27.8	14 55 5.55	16 19 20.3	5.3	5.1	0.35	13	1 31.1	19 0 1.38	24 6 39.3	5.8	5.6	0.41
29	0 28.8	15 0 3.00	16 42 56.6	5.3	5.1	0.36	14	1 32.6	19 5 28.37	24 0 8.8	5.8	5.6	0.41
30	0 29.8	15 5 1.68	17 6 6.9	5.3	5.1	0.36	15	1 34.1	19 10 54.71	23 52 54.3	5.8	5.6	0.41
31	0 30.8	15 10 1.59	17 28 50.5	5.3	5.1	0.36	16	1 35.6	19 16 20.34	23 44 56.2	5.8	5.6	0.41
Nov. 1	0 31.9	15 15 2.75	17 51 6.5	5.3	5.1	0.36	17	1 37.0	19 21 45.19	23 36 14.5	5.8	5.6	0.41
2	0 33.0	15 20 5.15	18 12 54.0	5.3	5.1	0.36	18	1 38.5	19 27 9.22	23 26 49.8	5.8	5.6	0.41
3	0 34.1	15 25 8.82	18 34 12.4	5.3	5.1	0.36	19	1 39.9	19 32 32.38	23 16 42.4	5.8	5.6	0.41
4	0 35.3	15 30 13.75	18 55 1.0	5.3	5.1	0.36	20	1 41.3	19 37 54.61	23 5 52.7	5.9	5.7	0.41
5	0 36.5	15 35 19.91	19 15 18.9	5.3	5.2	0.36	21	1 42.7	19 43 15.88	22 54 21.4	5.9	5.7	0.41
6	0 37.7	15 40 27.33	19 35 5.2	5.4	5.2	0.37	22	1 44.1	19 48 36.13	22 42 8.8	5.9	5.7	0.41
7	0 38.9	15 45 35.99	19 54 19.4	5.4	5.2	0.37	23	1 45.5	19 53 55.32	22 29 15.6	5.9	5.7	0.41
8	0 40.1	15 50 45.87	20 13 0.5	5.4	5.2	0.37	24	1 46.9	19 59 13.42	22 15 42.3	5.9	5.7	0.41
9	0 41.3	15 55 56.96	20 31 7.8	5.4	5.2	0.37	25	1 48.2	20 4 30.39	22 1 29.2	5.9	5.7	0.41
10	0 42.5	16 1 9.24	20 48 40.7	5.4	5.2	0.37	26	1 49.5	20 9 46.18	21 46 37.0	5.9	5.7	0.41
11	0 43.8	16 6 22.70	21 5 38.5	5.4	5.2	0.37	27	1 50.8	20 15 0.77	21 31 6.4	6.0	5.8	0.41
12	0 45.1	16 11 37.31	21 22 0.4	5.4	5.2	0.37	28	1 52.1	20 20 14.12	21 14 58.0	6.0	5.8	0.41
13	0 46.4	16 16 53.06	21 37 45.7	5.4	5.2	0.37	29	1 53.4	20 25 26.21	20 58 12.4	6.0	5.8	0.41
14	0 47.7	16 22 9.92	21 52 53.9	5.4	5.2	0.38	30	1 54.7	20 30 37.02	20 40 50.3	6.0	5.8	0.41
15	0 49.1	16 27 27.86	22 7 24.2	5.4	5.2	0.38	31	1 55.9	20 35 46.54	20 22 52.5	6.0	5.8	0.41
16	0 50.4	16 32 46.86	22 21 16.0	5.4	5.3	0.38	32	1 57.1	20 40 54.72	20 4 19.6	6.1	5.9	0.41

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	13 51.7	8 34 31.15	+22 46 22.3	13.0	7.4	0.54	Feb. 15	9 46.5	7 30 6.57	+25 54 38.2	11.8	6.8	0.50
1	13 46.5	8 33 17.24	22 52 59.5	13.1	7.5	0.54	16	9 42.0	7 29 29.27	25 54 14.0	11.7	6.7	0.50
2	13 41.3	8 32 0.45	22 59 40.8	13.1	7.5	0.54	17	9 37.5	7 28 55.45	25 53 40.1	11.6	6.6	0.49
3	13 36.0	8 30 40.87	23 6 25.1	13.2	7.5	0.54	18	9 33.0	7 28 25.13	25 52 57.0	11.5	6.6	0.49
4	13 30.8	8 29 18.62	23 13 11.6	13.2	7.5	0.55	19	9 28.7	7 27 58.26	25 52 5.0	11.4	6.5	0.48
5	13 25.4	8 27 53.85	+23 19 59.3	13.3	7.6	0.55	20	9 24.4	7 27 34.84	+25 51 4.3	11.3	6.5	0.48
6	13 20.0	8 26 26.70	23 26 47.3	13.4	7.6	0.55	21	9 20.1	7 27 14.84	25 49 55.1	11.2	6.4	0.48
7	13 14.6	8 24 57.27	23 33 34.8	13.4	7.6	0.55	22	9 15.9	7 26 58.27	25 48 38.0	11.1	6.4	0.47
8	13 9.2	8 23 25.73	23 40 20.8	13.5	7.6	0.56	23	9 11.8	7 26 45.07	25 47 13.0	11.0	6.3	0.47
9	13 3.7	8 21 52.24	23 47 4.4	13.5	7.6	0.56	24	9 7.7	7 26 35.19	25 45 40.4	10.9	6.2	0.46
10	12 58.1	8 20 16.98	+23 53 44.4	13.6	7.7	0.56	25	9 3.6	7 26 28.59	+25 44 0.5	10.8	6.2	0.46
11	12 52.6	8 18 40.14	24 0 19.9	13.6	7.7	0.56	26	8 59.6	7 26 25.25	25 42 13.5	10.7	6.1	0.46
12	12 47.0	8 17 1.91	24 6 49.9	13.6	7.7	0.56	27	8 55.7	7 26 25.12	25 40 19.6	10.6	6.0	0.45
13	12 41.4	8 15 22.52	24 13 13.6	13.6	7.7	0.56	28	8 51.8	7 26 28.16	25 38 19.1	10.5	6.0	0.45
14	12 35.8	8 13 42.16	24 19 30.0	13.6	7.7	0.56	Mar. 1	8 48.0	7 26 34.34	25 36 12.2	10.4	5.9	0.44
15	12 30.2	8 12 1.01	+24 25 38.3	13.6	7.7	0.56	2	8 44.2	7 26 43.60	+25 33 58.9	10.3	5.9	0.44
16	12 24.6	8 10 19.28	24 31 37.8	13.6	7.7	0.57	3	8 40.5	7 26 55.89	25 31 39.4	10.2	5.8	0.44
17	12 19.0	8 8 37.18	24 37 27.7	13.6	7.7	0.57	4	8 36.8	7 27 11.17	25 29 13.8	10.1	5.7	0.43
18	12 13.4	8 6 54.93	24 43 7.3	13.6	7.7	0.57	5	8 33.2	7 27 29.39	25 26 42.2	10.0	5.7	0.43
19	12 7.8	8 5 12.71	24 48 36.1	13.5	7.7	0.57	6	8 29.6	7 27 50.50	25 24 4.7	9.9	5.6	0.42
20	12 2.1	8 3 30.75	+24 53 53.5	13.5	7.7	0.57	7	8 26.0	7 28 14.46	+25 21 21.4	9.8	5.6	0.42
21	11 56.5	8 1 49.27	24 58 58.9	13.5	7.7	0.57	8	8 22.5	7 28 41.23	25 18 32.3	9.7	5.5	0.42
22	11 50.9	8 0 8.47	25 3 51.8	13.5	7.7	0.57	9	8 19.1	7 29 10.76	25 15 37.5	9.6	5.4	0.41
23	11 45.3	7 58 28.57	25 8 32.0	13.4	7.7	0.57	10	8 15.7	7 29 43.01	25 12 37.1	9.5	5.4	0.41
24	11 39.7	7 56 49.72	25 12 59.1	13.4	7.7	0.56	11	8 12.3	7 30 17.91	25 9 31.0	9.4	5.3	0.40
25	11 34.1	7 55 12.12	+25 17 12.7	13.3	7.6	0.56	12	8 9.1	7 30 55.42	+25 6 19.4	9.4	5.3	0.40
26	11 28.6	7 53 35.93	25 21 12.7	13.3	7.6	0.56	13	8 5.8	7 31 35.48	25 3 2.3	9.3	5.3	0.40
27	11 23.1	7 52 1.32	25 24 59.0	13.2	7.6	0.56	14	8 2.6	7 32 18.03	24 59 39.8	9.2	5.2	0.39
28	11 17.6	7 50 28.46	25 28 31.6	13.2	7.6	0.55	15	7 59.4	7 33 3.01	24 56 11.8	9.1	5.2	0.39
29	11 12.2	7 48 57.51	25 31 50.4	13.2	7.5	0.55	16	7 56.3	7 33 50.37	24 52 38.4	9.0	5.1	0.39
30	11 6.8	7 47 28.61	+25 34 55.4	13.1	7.5	0.55	17	7 53.1	7 34 40.07	+24 48 59.7	9.0	5.1	0.38
31	11 1.4	7 46 1.94	25 37 46.4	13.1	7.5	0.55	18	7 50.1	7 35 32.04	24 45 15.7	8.9	5.1	0.38
Feb. 1	10 56.1	7 44 37.64	25 40 23.6	13.1	7.5	0.55	19	7 47.0	7 36 26.23	24 41 26.3	8.8	5.0	0.37
2	10 50.8	7 43 15.86	25 42 47.0	13.0	7.4	0.54	20	7 44.0	7 37 22.58	24 37 31.6	8.7	5.0	0.37
3	10 45.5	7 41 56.71	25 44 57.0	12.9	7.4	0.54	21	7 41.1	7 38 21.04	24 33 31.6	8.6	4.9	0.36
4	10 40.3	7 40 40.30	+25 46 53.5	12.8	7.3	0.54	22	7 38.2	7 39 21.53	+24 29 26.4	8.6	4.9	0.36
5	10 35.2	7 39 26.72	25 48 36.7	12.7	7.3	0.54	23	7 35.3	7 40 24.00	24 25 15.9	8.5	4.9	0.36
6	10 30.1	7 38 16.11	25 50 6.9	12.7	7.2	0.53	24	7 32.4	7 41 28.40	24 21 0.1	8.4	4.8	0.35
7	10 25.0	7 37 8.56	25 51 24.4	12.6	7.1	0.53	25	7 29.6	7 42 34.69	24 16 39.0	8.3	4.8	0.35
8	10 20.0	7 36 4.16	25 52 29.4	12.5	7.1	0.53	26	7 26.8	7 43 42.81	24 12 12.6	8.2	4.7	0.35
9	10 15.1	7 35 2.97	+25 53 22.2	12.4	7.0	0.52	27	7 24.0	7 44 52.73	+24 7 40.8	8.2	4.7	0.34
10	10 10.2	7 34 5.08	25 54 2.9	12.3	7.0	0.52	28	7 21.3	7 46 4.38	24 3 3.7	8.1	4.7	0.34
11	10 5.3	7 33 10.54	25 54 32.0	12.2	7.0	0.52	29	7 18.6	7 47 17.73	23 58 21.1	8.0	4.6	0.34
12	10 0.6	7 32 19.39	25 54 49.7	12.1	6.9	0.51	30	7 15.5	7 48 32.72	23 53 33.0	8.0	4.6	0.33
13	9 55.8	7 31 31.66	25 54 56.4	12.0	6.9	0.51	31	7 13.2	7 49 49.33	23 48 39.3	7.9	4.5	0.33
14	9 51.2	7 30 47.38	+25 54 52.5	11.9	6.8	0.50	Apr. 1	7 10.6	7 51 7.52	+23 43 40.1	7.9	4.5	0.33
15	9 46.5	7 30 6.57	+25 54 38.2	11.8	6.8	0.50	2	7 8.0	7 52 27.24	+23 38 35.3	7.8	4.5	0.33

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	7 10.6	7 51 7.52	+23 43 40.1	7.9	4.5	0.33	May 16	5 30.5	9 8 10.16	+18 14 28.7	5.7	3.3	0.23
2	7 8.0	7 52 27.24	23 38 35.2	7.8	4.5	0.33	17	5 28.5	9 10 8.46	18 4 44.8	5.7	3.3	0.23
3	7 5.4	7 53 48.46	23 33 24.7	7.7	4.4	0.33	18	5 26.6	9 12 7.14	17 54 54.6	5.7	3.3	0.23
4	7 2.8	7 55 11.13	23 28 8.5	7.7	4.4	0.33	19	5 24.6	9 14 6.20	17 44 58.2	5.6	3.2	0.22
5	7 0.3	7 56 35.23	23 22 46.5	7.6	4.3	0.32	20	5 22.7	9 16 5.62	17 34 55.7	5.6	3.2	0.22
6	6 57.8	7 58 0.73	+23 17 18.7	7.6	4.3	0.32	21	5 20.7	9 18 5.40	+17 24 47.1	5.6	3.2	0.22
7	6 55.3	7 59 27.59	23 11 45.0	7.6	4.3	0.32	22	5 18.8	9 20 5.51	17 14 32.4	5.6	3.2	0.22
8	6 52.8	8 0 55.77	23 6 5.4	7.5	4.3	0.31	23	5 16.9	9 22 5.95	17 4 11.6	5.5	3.2	0.22
9	6 50.4	8 2 25.23	23 0 19.9	7.5	4.2	0.31	24	5 14.9	9 24 6.69	16 53 44.8	5.5	3.2	0.22
10	6 48.0	8 3 55.95	22 54 28.3	7.4	4.2	0.31	25	5 13.0	9 26 7.74	16 43 11.9	5.4	3.1	0.22
11	6 45.6	8 5 27.90	+22 48 30.7	7.3	4.2	0.30	26	5 11.1	9 28 9.09	+16 32 33.1	5.4	3.1	0.21
12	6 43.2	8 7 1.03	22 42 27.0	7.3	4.2	0.30	27	5 9.2	9 30 10.73	16 21 48.4	5.4	3.1	0.21
13	6 40.9	8 8 35.32	22 36 17.3	7.2	4.1	0.30	28	5 7.3	9 32 12.66	16 10 57.6	5.4	3.1	0.21
14	6 38.5	8 10 10.72	22 30 1.5	7.2	4.1	0.29	29	5 5.4	9 34 14.88	16 0 1.1	5.3	3.1	0.21
15	6 36.2	8 11 47.21	22 23 39.5	7.1	4.1	0.29	30	5 3.5	9 36 17.36	15 48 58.6	5.3	3.0	0.21
16	6 33.8	8 13 24.75	+22 17 11.4	7.0	4.0	0.29	31	5 1.6	9 38 20.11	+15 37 50.2	5.3	3.0	0.21
17	6 31.5	8 15 3.30	22 10 37.2	7.0	4.0	0.29	June 1	4 59.7	9 40 23.13	15 26 35.9	5.3	3.0	0.21
18	6 29.3	8 16 42.82	22 3 56.8	6.9	4.0	0.28	2	4 57.8	9 42 26.41	15 15 15.7	5.3	3.0	0.21
19	6 27.0	8 18 23.29	21 57 10.3	6.9	3.9	0.28	3	4 55.9	9 44 29.95	15 3 49.7	5.3	2.9	0.21
20	6 24.8	8 20 4.69	21 50 17.6	6.8	3.9	0.28	4	4 54.1	9 46 33.73	14 52 17.9	5.2	2.9	0.21
21	6 22.5	8 21 46.99	+21 43 18.5	6.8	3.9	0.28	5	4 52.2	9 48 37.75	+14 40 40.5	5.2	2.9	0.21
22	6 20.3	8 23 30.17	21 36 13.3	6.8	3.9	0.28	6	4 50.3	9 50 42.00	14 28 57.3	5.2	2.9	0.20
23	6 18.2	8 25 14.19	21 29 1.9	6.7	3.8	0.27	7	4 48.5	9 52 46.49	14 17 8.6	5.2	2.9	0.20
24	6 16.0	8 26 59.03	21 21 44.3	6.7	3.8	0.27	8	4 46.6	9 54 51.21	14 5 14.2	5.2	2.9	0.20
25	6 13.8	8 28 44.66	21 14 20.5	6.6	3.7	0.27	9	4 44.7	9 56 56.16	13 53 14.3	5.1	2.9	0.20
26	6 11.6	8 30 31.04	+21 6 50.5	6.5	3.7	0.27	10	4 42.9	9 59 1.33	+13 41 8.9	5.1	2.9	0.20
27	6 9.4	8 32 18.15	20 59 14.1	6.5	3.7	0.27	11	4 41.0	10 1 6.70	13 28 58.0	5.1	2.9	0.20
28	6 7.3	8 34 5.96	20 51 31.4	6.4	3.7	0.26	12	4 39.2	10 3 12.29	13 16 41.9	5.1	2.9	0.20
29	6 5.2	8 35 54.46	20 43 42.4	6.4	3.6	0.26	13	4 37.4	10 5 18.06	13 4 20.5	5.1	2.8	0.20
30	6 3.0	8 37 43.64	20 35 47.1	6.3	3.6	0.26	14	4 35.5	10 7 24.02	12 51 53.8	5.0	2.8	0.20
May 1	6 0.9	8 39 33.50	+20 27 45.3	6.3	3.6	0.26	15	4 33.7	10 9 30.17	+12 39 21.9	5.0	2.8	0.20
2	5 58.8	8 41 24.01	20 19 37.3	6.3	3.6	0.26	16	4 31.9	10 11 36.51	12 26 44.9	5.0	2.8	0.19
3	5 56.7	8 43 15.15	20 11 22.8	6.2	3.6	0.26	17	4 30.0	10 13 43.01	12 14 2.9	5.0	2.8	0.19
4	5 54.7	8 45 6.91	20 3 1.9	6.2	3.6	0.25	18	4 28.2	10 15 49.69	12 1 15.9	5.0	2.8	0.19
5	5 52.6	8 46 59.26	19 54 34.5	6.1	3.5	0.25	19	4 26.4	10 17 56.53	11 48 24.0	4.9	2.8	0.19
6	5 50.6	8 48 52.20	+19 46 0.6	6.1	3.5	0.25	20	4 24.6	10 20 3.55	+11 35 27.2	4.9	2.8	0.19
7	5 48.5	8 50 45.71	19 37 20.3	6.1	3.5	0.25	21	4 22.7	10 22 10.71	11 22 25.7	4.9	2.8	0.19
8	5 46.5	8 52 39.77	19 28 33.5	6.0	3.5	0.25	22	4 20.9	10 24 18.04	11 9 19.4	4.9	2.8	0.19
9	5 44.5	8 54 34.36	19 19 40.3	6.0	3.4	0.24	23	4 19.1	10 26 25.52	10 56 8.4	4.9	2.8	0.19
10	5 42.4	8 56 29.48	19 10 40.6	5.9	3.4	0.24	24	4 17.3	10 28 33.17	10 42 52.7	4.8	2.7	0.19
11	5 40.4	8 58 25.11	+19 1 34.5	5.9	3.4	0.24	25	4 15.5	10 30 40.97	+10 29 32.5	4.8	2.7	0.19
12	5 38.4	9 0 21.22	18 52 22.1	5.9	3.4	0.24	26	4 13.7	10 32 48.93	10 16 7.7	4.8	2.7	0.18
13	5 36.4	9 2 17.80	18 43 3.2	5.8	3.4	0.24	27	4 11.9	10 34 57.05	10 2 38.3	4.8	2.7	0.18
14	5 34.4	9 4 14.82	18 33 38.0	5.8	3.4	0.23	28	4 10.1	10 37 5.32	9 49 4.6	4.8	2.7	0.18
15	5 32.4	9 6 12.27	18 24 6.5	5.7	3.3	0.23	29	4 8.3	10 39 13.77	9 35 26.4	4.7	2.7	0.18
16	5 30.5	9 8 10.16	+18 14 28.7	5.7	3.3	0.23	30	4 6.5	10 41 22.40	+9 21 43.8	4.7	2.7	0.18
17	5 28.5	9 10 8.46	+18 4 44.8	5.7	3.3	0.23	July 1	4 4.7	10 43 31.19	+9 7 56.9	4.7	2.7	0.18

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Feb. 1	17 40.3	14 30 0.19	13 27 20.6	1.7	17.7	1.30	Mar. 17	14 47.3	14 29 59.38	13 18 32.8	1.9	20.1	1.47
2	17 36.7	14 30 15.49	13 28 22.5	1.7	17.8	1.30	18	14 43.1	14 29 43.47	13 17 6.2	1.9	20.2	1.47
3	17 33.0	14 30 30.12	13 29 20.9	1.7	17.8	1.31	19	14 38.9	14 29 26.95	13 15 36.7	1.9	20.2	1.48
4	17 29.3	14 30 44.07	13 30 15.9	1.7	17.9	1.31	20	14 34.7	14 29 9.80	13 14 4.3	1.9	20.3	1.48
5	17 25.6	14 30 57.33	13 31 7.5	1.7	17.9	1.31	21	14 30.5	14 28 52.05	13 12 29.1	1.9	20.3	1.48
6	17 21.9	14 31 9.90	13 31 55.7	1.7	18.0	1.32	22	14 26.2	14 28 33.70	13 10 51.0	1.9	20.4	1.48
7	17 18.1	14 31 21.78	13 32 40.5	1.7	18.1	1.32	23	14 22.0	14 28 14.75	13 9 10.2	1.9	20.4	1.49
8	17 14.4	14 31 32.96	13 33 21.8	1.7	18.1	1.32	24	14 17.8	14 27 55.23	13 7 26.7	1.9	20.5	1.49
9	17 10.6	14 31 43.43	13 33 59.6	1.7	18.2	1.33	25	14 13.5	14 27 35.15	13 5 40.6	1.9	20.5	1.49
10	17 6.9	14 31 53.20	13 34 34.1	1.7	18.2	1.33	26	14 9.2	14 27 14.53	13 3 51.9	1.9	20.5	1.49
11	17 3.1	14 32 2.26	13 35 5.1	1.7	18.3	1.34	27	14 4.9	14 26 53.37	13 2 0.7	1.9	20.6	1.50
12	16 59.2	14 32 10.59	13 35 32.6	1.7	18.4	1.34	28	14 0.6	14 26 31.68	13 0 7.0	1.9	20.6	1.50
13	16 55.4	14 32 18.21	13 35 56.6	1.7	18.4	1.34	29	13 56.3	14 26 9.47	12 58 11.0	2.0	20.7	1.50
14	16 51.6	14 32 25.11	13 36 17.1	1.7	18.5	1.35	30	13 52.0	14 25 46.76	12 56 12.6	2.0	20.7	1.50
15	16 47.8	14 32 31.30	13 36 34.1	1.7	18.5	1.35	31	13 47.7	14 25 23.56	12 54 11.9	2.0	20.7	1.51
16	16 44.0	14 32 36.76	13 36 47.8	1.8	18.6	1.35	Apr. 1	13 43.4	14 24 59.89	12 52 8.9	2.0	20.8	1.51
17	16 40.1	14 32 41.48	13 36 57.9	1.8	18.6	1.36	2	13 39.0	14 24 35.76	12 50 3.8	2.0	20.8	1.51
18	16 36.2	14 32 45.48	13 37 4.5	1.8	18.7	1.36	3	13 34.7	14 24 11.19	12 47 56.8	2.0	20.8	1.52
19	16 32.3	14 32 48.75	13 37 7.6	1.8	18.7	1.37	4	13 30.3	14 23 46.21	12 45 47.8	2.0	20.9	1.52
20	16 28.5	14 32 51.29	13 37 7.3	1.8	18.8	1.37	5	13 26.0	14 23 20.81	12 43 36.9	2.0	20.9	1.52
21	16 24.6	14 32 53.10	13 37 3.5	1.8	18.8	1.38	6	13 21.6	14 22 55.02	12 41 24.1	2.0	20.9	1.52
22	16 20.7	14 32 54.18	13 36 56.3	1.8	18.9	1.38	7	13 17.3	14 22 28.85	12 39 9.6	2.0	21.0	1.53
23	16 16.8	14 32 54.53	13 36 45.6	1.8	19.0	1.39	8	13 12.9	14 22 2.33	12 36 53.4	2.0	21.0	1.53
24	16 12.8	14 32 54.15	13 36 31.4	1.8	19.0	1.39	9	13 8.5	14 21 35.46	12 34 35.6	2.0	21.0	1.53
25	16 8.9	14 32 53.04	13 36 13.7	1.8	19.1	1.40	10	13 4.1	14 21 8.27	12 32 16.4	2.0	21.0	1.53
26	16 4.9	14 32 51.19	13 35 52.7	1.8	19.2	1.40	11	12 59.7	14 20 40.80	12 29 55.9	2.0	21.1	1.53
27	16 0.9	14 32 48.61	13 35 28.2	1.8	19.2	1.41	12	12 55.4	14 20 13.05	12 27 34.1	2.0	21.1	1.53
28	15 56.9	14 32 45.30	13 35 0.2	1.8	19.3	1.41	13	12 51.0	14 19 45.05	12 25 11.1	2.0	21.1	1.53
Mar. 1	15 52.9	14 32 41.26	13 34 28.8	1.8	19.3	1.41	14	12 46.6	14 19 16.80	12 22 47.1	2.0	21.1	1.54
2	15 48.9	14 32 36.49	13 33 53.9	1.8	19.4	1.42	15	12 42.2	14 18 48.34	12 20 22.1	2.0	21.1	1.54
3	15 44.9	14 32 30.98	13 33 15.7	1.9	19.4	1.42	16	12 37.8	14 18 19.68	12 17 56.2	2.0	21.2	1.54
4	15 40.9	14 32 24.75	13 32 34.1	1.9	19.5	1.42	17	12 33.4	14 17 50.85	12 15 29.5	2.0	21.2	1.54
5	15 36.8	14 32 17.80	13 31 49.1	1.9	19.5	1.43	18	12 28.9	14 17 21.87	12 13 2.2	2.0	21.2	1.54
6	15 32.8	14 32 10.12	13 31 0.7	1.9	19.6	1.43	19	12 24.5	14 16 52.75	12 10 34.4	2.0	21.2	1.54
7	15 28.7	14 32 1.72	13 30 8.9	1.9	19.6	1.44	20	12 20.1	14 16 23.52	12 8 6.0	2.0	21.2	1.54
8	15 24.6	14 31 52.61	13 29 13.8	1.9	19.7	1.44	21	12 15.7	14 15 54.19	12 5 37.2	2.0	21.3	1.54
9	15 20.5	14 31 42.78	13 28 15.4	1.9	19.7	1.44	22	12 11.3	14 15 24.79	12 3 8.3	2.0	21.3	1.54
10	15 16.4	14 31 32.26	13 27 13.7	1.9	19.8	1.45	23	12 6.8	14 14 55.34	12 0 39.2	2.0	21.3	1.54
11	15 12.3	14 31 21.03	13 26 8.7	1.9	19.8	1.45	24	12 2.4	14 14 25.85	11 58 10.0	2.0	21.3	1.54
12	15 8.1	14 31 9.11	13 25 0.5	1.9	19.9	1.46	25	11 58.0	14 13 56.34	11 55 40.8	2.0	21.3	1.54
13	15 4.0	14 30 56.51	13 23 49.2	1.9	19.9	1.46	26	11 53.6	14 13 26.84	11 53 11.7	2.0	21.3	1.54
14	14 59.9	14 30 43.23	13 22 34.7	1.9	20.0	1.46	27	11 49.2	14 12 57.36	11 50 42.9	2.0	21.3	1.54
15	14 55.7	14 30 29.27	13 21 17.1	1.9	20.0	1.47	28	11 44.7	14 12 27.91	11 48 14.3	2.0	21.3	1.54
16	14 51.5	14 30 14.65	13 19 56.5	1.9	20.1	1.47	29	11 40.3	14 11 58.52	11 45 46.2	2.0	21.3	1.54
17	14 47.3	14 29 59.38	13 18 32.8	1.9	20.1	1.47	30	11 35.9	14 11 29.22	11 43 18.8	2.0	21.3	1.54
18	14 43.1	14 29 43.47	13 17 6.2	1.9	20.2	1.47	May 1	11 31.5	14 11 0.02	11 40 52.0	2.0	21.2	1.54
19	14 38.9	14 29 26.95	13 15 36.7	1.9	20.2	1.48	2	11 27.1	14 10 30.95	11 38 25.9	2.0	21.2	1.54

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
May 1	11 31.5	14 11 0.02	11 40 52.0	2.0	21.2	1.54	June 15	8 19.0	13 55 26.39	10 26 48.1	1.9	19.8	1.43
2	11 27.1	14 10 30.95	11 38 25.9	2.0	21.2	1.54	16	8 15.0	13 55 18.52	10 26 21.7	1.9	19.7	1.43
3	11 22.7	14 10 2.03	11 36 0.6	2.0	21.2	1.54	17	8 10.9	13 55 11.32	10 25 59.1	1.8	19.7	1.42
4	11 18.3	14 9 33.26	11 33 36.3	2.0	21.2	1.54	18	8 6.9	13 55 4.79	10 25 40.3	1.8	19.6	1.42
5	11 13.8	14 9 4.67	11 31 13.1	2.0	21.2	1.54	19	8 2.8	13 54 58.95	10 25 25.2	1.8	19.6	1.42
6	11 9.4	14 8 36.28	11 28 51.0	2.0	21.2	1.54	20	7 58.8	13 54 53.79	10 25 13.9	1.8	19.5	1.41
7	11 5.0	14 8 8.10	11 26 30.2	2.0	21.1	1.53	21	7 54.8	13 54 49.30	10 25 6.5	1.8	19.5	1.41
8	11 0.6	14 7 40.17	11 24 10.9	2.0	21.1	1.53	22	7 50.8	13 54 45.48	10 25 2.8	1.8	19.4	1.41
9	10 56.3	14 7 12.50	11 21 53.1	2.0	21.1	1.53	23	7 46.8	13 54 42.35	10 25 2.7	1.8	19.4	1.40
10	10 51.9	14 6 45.10	11 19 36.9	2.0	21.1	1.53	24	7 42.9	13 54 39.90	10 25 6.4	1.8	19.3	1.40
11	10 47.5	14 6 17.99	11 17 22.4	2.0	21.1	1.53	25	7 38.9	13 54 38.12	10 25 13.9	1.8	19.3	1.40
12	10 43.1	14 5 51.20	11 15 9.8	2.0	21.1	1.53	26	7 35.0	13 54 37.02	10 25 25.3	1.8	19.2	1.39
13	10 38.7	14 5 24.76	11 12 59.0	2.0	21.1	1.52	27	7 31.0	13 54 36.60	10 25 40.4	1.8	19.2	1.39
14	10 34.4	14 4 58.68	11 10 50.2	2.0	21.1	1.52	28	7 27.1	13 54 36.87	10 25 59.2	1.8	19.1	1.38
15	10 30.0	14 4 32.97	11 8 43.4	2.0	21.0	1.52	29	7 23.2	13 54 37.82	10 26 21.7	1.8	19.1	1.38
16	10 25.6	14 4 7.64	11 6 38.9	2.0	21.0	1.52	30	7 19.3	13 54 39.44	10 26 48.1	1.8	19.0	1.38
17	10 21.3	14 3 42.69	11 4 36.7	2.0	21.0	1.52	July 1	7 15.4	13 54 41.74	10 27 18.3	1.8	19.0	1.37
18	10 17.0	14 3 18.16	11 2 36.7	2.0	21.0	1.51	2	7 11.5	13 54 44.72	10 27 52.2	1.8	18.9	1.37
19	10 12.6	14 2 54.06	11 0 39.0	2.0	20.9	1.51	3	7 7.6	13 54 48.38	10 28 29.8	1.8	18.9	1.37
20	10 8.3	14 2 30.40	10 58 43.9	2.0	20.9	1.51	4	7 3.8	13 54 52.71	10 29 11.0	1.8	18.8	1.36
21	10 4.0	14 2 7.20	10 56 51.5	2.0	20.9	1.51	5	6 59.9	13 54 57.73	10 29 55.9	1.8	18.8	1.36
22	9 59.7	14 1 44.46	10 55 1.6	2.0	20.8	1.50	6	6 56.1	13 55 3.42	10 30 44.6	1.8	18.7	1.35
23	9 55.4	14 1 22.21	10 53 14.3	2.0	20.8	1.50	7	6 52.2	13 55 9.78	10 31 36.8	1.8	18.7	1.35
24	9 51.1	14 1 0.45	10 51 29.9	2.0	20.8	1.50	8	6 48.4	13 55 16.82	10 32 32.7	1.8	18.6	1.34
25	9 46.8	14 0 39.19	10 49 48.4	2.0	20.7	1.49	9	6 44.6	13 55 24.52	10 33 32.3	1.8	18.5	1.34
26	9 42.5	14 0 18.44	10 48 9.7	1.9	20.7	1.49	10	6 40.8	13 55 32.88	10 34 35.4	1.8	18.5	1.33
27	9 38.2	13 59 58.21	10 46 34.0	1.9	20.6	1.49	11	6 37.1	13 55 41.91	10 35 42.0	1.7	18.4	1.33
28	9 34.0	13 59 38.53	10 45 1.3	1.9	20.6	1.49	12	6 33.3	13 55 51.60	10 36 52.1	1.7	18.3	1.32
29	9 29.7	13 59 19.40	10 43 31.7	1.9	20.6	1.48	13	6 29.5	13 56 1.94	10 38 5.8	1.7	18.3	1.32
30	9 25.5	13 59 0.82	10 42 5.2	1.9	20.5	1.48	14	6 25.8	13 56 12.93	10 39 22.9	1.7	18.2	1.31
31	9 21.3	13 58 42.81	10 40 41.9	1.9	20.5	1.48	15	6 22.0	13 56 24.56	10 40 43.4	1.7	18.2	1.31
June 1	9 17.1	13 58 25.38	10 39 21.9	1.9	20.4	1.48	16	6 18.3	13 56 36.83	10 42 7.3	1.7	18.1	1.31
2	9 12.9	13 58 8.53	10 38 5.2	1.9	20.4	1.47	17	6 14.6	13 56 49.74	10 43 34.6	1.7	18.1	1.30
3	9 8.7	13 57 52.26	10 36 51.7	1.9	20.4	1.47	18	6 10.9	13 57 3.28	10 45 5.3	1.7	18.0	1.30
4	9 4.5	13 57 36.59	10 35 41.7	1.9	20.3	1.47	19	6 7.2	13 57 17.43	10 46 39.3	1.7	18.0	1.30
5	9 0.3	13 57 21.55	10 34 35.2	1.9	20.3	1.47	20	6 3.5	13 57 32.21	10 48 16.5	1.7	17.9	1.29
6	8 56.1	13 57 7.13	10 33 32.2	1.9	20.2	1.46	21	5 59.8	13 57 47.62	10 49 56.8	1.7	17.9	1.29
7	8 51.9	13 56 53.34	10 32 32.8	1.9	20.2	1.46	22	5 56.2	13 58 3.64	10 51 40.2	1.7	17.8	1.28
8	8 47.8	13 56 40.19	10 31 36.8	1.9	20.2	1.46	23	5 52.5	13 58 20.25	10 53 26.8	1.7	17.8	1.28
9	8 43.6	13 56 27.63	10 30 44.6	1.9	20.1	1.45	24	5 48.9	13 58 37.47	10 55 16.7	1.7	17.7	1.28
10	8 39.5	13 56 15.81	10 29 56.0	1.9	20.1	1.45	25	5 45.2	13 58 55.28	10 57 9.6	1.7	17.7	1.27
11	8 35.4	13 56 4.60	10 29 11.0	1.9	20.0	1.44	26	5 41.6	13 59 13.68	10 59 5.6	1.7	17.6	1.27
12	8 31.3	13 55 54.04	10 28 29.6	1.9	19.9	1.44	27	5 38.0	13 59 32.68	11 1 4.4	1.7	17.6	1.27
13	8 27.2	13 55 44.15	10 27 52.0	1.9	19.9	1.44	28	5 34.4	13 59 52.27	11 3 6.2	1.7	17.5	1.26
14	8 23.1	13 55 34.93	10 27 18.2	1.9	19.8	1.43	29	5 30.8	14 0 12.44	11 5 11.1	1.7	17.5	1.26
15	8 19.0	13 55 26.39	10 26 48.1	1.9	19.8	1.43	30	5 27.2	14 0 33.18	11 7 18.8	1.6	17.4	1.26
16	8 15.0	13 55 18.52	10 26 21.7	1.9	19.7	1.43	31	5 23.6	14 0 54.50	11 9 29.4	1.6	17.4	1.26

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Mar. 16	17 52.6	17 31 51.71	21 50 56.8	0.9	7.8	0.60	May 1	14 49.7	17 29 44.77	21 46 21.3	1.0	8.4	0.64
17	17 48.8	17 31 58.32	21 50 56.4	0.9	7.8	0.60	2	14 45.5	17 29 32.91	21 46 10.5	1.0	8.4	0.65
18	17 45.0	17 32 4.52	21 50 55.7	0.9	7.8	0.60	3	14 41.4	17 29 20.71	21 45 59.5	1.0	8.4	0.65
19	17 41.2	17 32 10.28	21 50 54.8	0.9	7.8	0.60	4	14 37.3	17 29 8.19	21 45 48.2	1.0	8.4	0.65
20	17 37.3	17 32 15.63	21 50 53.6	0.9	7.8	0.60	5	14 33.1	17 28 55.36	21 45 36.8	1.0	8.4	0.65
21	17 33.5	17 32 20.55	21 50 52.1	0.9	7.9	0.60	6	14 29.0	17 28 42.21	21 45 25.3	1.0	8.5	0.65
22	17 29.6	17 32 25.05	21 50 50.2	0.9	7.9	0.61	7	14 24.8	17 28 28.75	21 45 13.6	1.0	8.5	0.65
23	17 25.8	17 32 29.14	21 50 48.0	0.9	7.9	0.61	8	14 20.6	17 28 15.01	21 45 1.8	1.0	8.5	0.65
24	17 21.9	17 32 32.80	21 50 45.6	0.9	7.9	0.61	9	14 16.5	17 28 0.98	21 44 49.8	1.0	8.5	0.65
25	17 18.0	17 32 36.03	21 50 42.9	0.9	7.9	0.61	10	14 12.3	17 27 46.67	21 44 37.7	1.0	8.5	0.65
26	17 14.1	17 32 38.84	21 50 40.0	0.9	8.0	0.61	11	14 8.1	17 27 32.08	21 44 25.4	1.0	8.5	0.65
27	17 10.2	17 32 41.23	21 50 36.8	0.9	8.0	0.61	12	14 4.0	17 27 17.23	21 44 12.9	1.0	8.5	0.65
28	17 6.3	17 32 43.20	21 50 33.4	0.9	8.0	0.61	13	13 59.8	17 27 2.11	21 44 0.3	1.0	8.5	0.66
29	17 2.4	17 32 44.74	21 50 29.7	0.9	8.0	0.61	14	13 55.6	17 26 46.73	21 43 47.5	1.0	8.5	0.66
30	16 58.5	17 32 45.85	21 50 25.7	0.9	8.0	0.62	15	13 51.4	17 26 31.11	21 43 34.6	1.0	8.5	0.66
31	16 54.6	17 32 46.53	21 50 21.4	0.9	8.0	0.62	16	13 47.2	17 26 15.27	21 43 21.6	1.0	8.6	0.66
Apr. 1	16 50.7	17 32 46.79	21 50 16.9	0.9	8.1	0.62	17	13 43.0	17 25 59.19	21 43 8.5	1.0	8.6	0.66
2	16 46.7	17 32 46.63	21 50 12.2	0.9	8.1	0.62	18	13 38.8	17 25 42.89	21 42 55.3	1.0	8.6	0.66
3	16 42.8	17 32 46.04	21 50 7.2	0.9	8.1	0.62	19	13 34.6	17 25 26.37	21 42 41.9	1.0	8.6	0.66
4	16 38.8	17 32 45.01	21 50 2.0	0.9	8.1	0.62	20	13 30.4	17 25 9.66	21 42 28.4	1.0	8.6	0.66
5	16 34.9	17 32 43.56	21 49 56.6	0.9	8.1	0.62	21	13 26.2	17 24 52.76	21 42 14.8	1.0	8.6	0.66
6	16 30.9	17 32 41.70	21 49 50.9	0.9	8.2	0.62	22	13 22.0	17 24 35.67	21 42 1.1	1.0	8.6	0.66
7	16 26.9	17 32 39.42	21 49 45.0	0.9	8.2	0.63	23	13 17.7	17 24 18.40	21 41 47.4	1.0	8.6	0.66
8	16 23.0	17 32 36.71	21 49 38.8	0.9	8.2	0.63	24	13 13.5	17 24 0.97	21 41 33.5	1.0	8.6	0.66
9	16 19.0	17 32 33.58	21 49 32.4	0.9	8.2	0.63	25	13 9.3	17 23 43.37	21 41 19.4	1.0	8.6	0.66
10	16 15.0	17 32 30.03	21 49 25.8	0.9	8.2	0.63	26	13 5.1	17 23 25.61	21 41 5.2	1.0	8.6	0.66
11	16 11.0	17 32 26.07	21 49 19.0	0.9	8.2	0.63	27	13 0.8	17 23 7.71	21 40 51.0	1.0	8.6	0.66
12	16 7.0	17 32 21.69	21 49 12.1	0.9	8.2	0.63	28	12 56.6	17 22 49.68	21 40 36.7	1.0	8.6	0.66
13	16 3.0	17 32 16.90	21 49 4.9	0.9	8.2	0.63	29	12 52.4	17 22 31.52	21 40 22.3	1.0	8.6	0.66
14	15 58.9	17 32 11.71	21 48 57.5	0.9	8.3	0.63	30	12 48.1	17 22 13.23	21 40 7.9	1.0	8.6	0.66
15	15 54.9	17 32 6.12	21 48 49.9	0.9	8.3	0.63	31	12 43.9	17 21 54.83	21 39 53.5	1.0	8.6	0.66
16	15 50.9	17 32 0.12	21 48 42.1	0.9	8.3	0.63	June 1	12 39.7	17 21 36.34	21 39 39.0	1.0	8.6	0.66
17	15 46.9	17 31 53.73	21 48 34.1	0.9	8.3	0.63	2	12 35.4	17 21 17.76	21 39 24.5	1.0	8.6	0.66
18	15 42.8	17 31 46.95	21 48 25.8	0.9	8.3	0.63	3	12 31.2	17 20 59.09	21 39 9.9	1.0	8.6	0.66
19	15 38.8	17 31 39.77	21 48 17.3	0.9	8.3	0.63	4	12 26.9	17 20 40.34	21 38 55.3	1.0	8.6	0.66
20	15 34.7	17 31 32.21	21 48 8.7	0.9	8.3	0.64	5	12 22.7	17 20 21.53	21 38 40.6	1.0	8.6	0.66
21	15 30.6	17 31 24.27	21 47 59.9	0.9	8.3	0.64	6	12 18.4	17 20 2.68	21 38 26.0	1.0	8.6	0.66
22	15 26.6	17 31 15.96	21 47 50.8	0.9	8.4	0.64	7	12 14.2	17 19 43.77	21 38 11.3	1.0	8.6	0.66
23	15 22.5	17 31 7.27	21 47 41.6	0.9	8.4	0.64	8	12 10.0	17 19 24.82	21 37 56.6	1.0	8.6	0.66
24	15 18.4	17 30 58.21	21 47 32.2	0.9	8.4	0.64	9	12 5.7	17 19 5.86	21 37 41.9	1.0	8.6	0.66
25	15 14.3	17 30 48.78	21 47 22.7	0.9	8.4	0.64	10	12 1.5	17 18 46.90	21 37 27.3	1.0	8.6	0.66
26	15 10.2	17 30 38.99	21 47 13.0	0.9	8.4	0.64	11	11 57.2	17 18 27.92	21 37 12.7	1.0	8.6	0.66
27	15 6.1	17 30 28.84	21 47 3.1	0.9	8.4	0.64	12	11 53.0	17 18 8.95	21 36 58.1	1.0	8.6	0.66
28	15 2.0	17 30 18.34	21 46 52.9	0.9	8.4	0.64	13	11 48.7	17 17 50.01	21 36 43.6	1.0	8.6	0.66
29	14 57.9	17 30 7.49	21 46 42.5	0.9	8.4	0.64	14	11 44.5	17 17 31.09	21 36 29.2	1.0	8.6	0.66
30	14 53.8	17 29 56.30	21 46 32.0	1.0	8.4	0.64	15	11 40.2	17 17 12.20	21 36 14.8	1.0	8.6	0.66
May 1	14 49.7	17 29 44.77	21 46 21.3	1.0	8.4	0.64	16	11 36.0	17 16 53.35	21 36 0.5	1.0	8.6	0.66



## FOR TRANSIT AT WASHINGTON.

Data.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Data.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	" ' "	"	"	s		h m	h m s	" ' "	"	"	s
June 16	11 36.0	17 16 53.35	-21 36 0.5	1.0	8.6	0.66	Aug. 1	8 24.0	17 5 41.13	-21 29 30.1	0.9	8.3	0.64
17	11 31.7	17 16 34.57	21 35 46.3	1.0	8.6	0.66	2	8 19.9	17 5 33.38	21 29 31.2	0.9	8.3	0.63
18	11 27.5	17 16 15.85	21 35 32.2	1.0	8.6	0.66	3	8 15.8	17 5 26.01	21 29 32.8	0.9	8.2	0.63
19	11 23.3	17 15 57.21	21 35 18.2	1.0	8.6	0.66	4	8 11.8	17 5 19.03	21 29 35.0	0.9	8.2	0.63
20	11 19.0	17 15 38.64	21 35 4.3	1.0	8.6	0.66	5	8 7.7	17 5 12.42	21 29 37.7	0.9	8.2	0.63
21	11 14.8	17 15 20.17	-21 34 50.6	1.0	8.6	0.66	6	8 3.7	17 5 6.20	-21 29 40.9	0.9	8.2	0.63
22	11 10.5	17 15 1.80	21 34 37.0	1.0	8.6	0.66	7	7 59.7	17 5 0.38	21 29 44.7	0.9	8.2	0.63
23	11 6.3	17 14 43.53	21 34 23.6	1.0	8.6	0.66	8	7 55.7	17 4 54.96	21 29 49.0	0.9	8.2	0.63
24	11 2.1	17 14 25.38	21 34 10.3	1.0	8.6	0.66	9	7 51.6	17 4 49.93	21 29 53.9	0.9	8.2	0.63
25	10 57.8	17 14 7.36	21 33 57.2	1.0	8.6	0.66	10	7 47.6	17 4 45.30	21 29 59.3	0.9	8.2	0.63
26	10 53.6	17 13 49.47	-21 33 44.2	1.0	8.6	0.66	11	7 43.6	17 4 41.07	-21 30 5.3	0.9	8.1	0.63
27	10 49.4	17 13 31.73	21 33 31.4	1.0	8.6	0.66	12	7 39.6	17 4 37.25	21 30 11.8	0.9	8.1	0.63
28	10 45.2	17 13 14.13	21 33 18.8	1.0	8.6	0.66	13	7 35.7	17 4 33.83	21 30 18.9	0.9	8.1	0.63
29	10 40.9	17 12 56.70	21 33 6.5	1.0	8.6	0.66	14	7 31.7	17 4 30.81	21 30 26.6	0.9	8.1	0.62
30	10 36.7	17 12 39.44	21 32 54.5	1.0	8.6	0.66	15	7 27.7	17 4 28.20	21 30 34.9	0.9	8.1	0.62
July 1	10 32.5	17 12 22.34	-21 32 42.6	1.0	8.6	0.66	16	7 23.7	17 4 26.00	-21 30 43.7	0.9	8.1	0.62
2	10 28.3	17 12 5.42	21 32 31.0	1.0	8.6	0.66	17	7 19.8	17 4 24.21	21 30 53.0	0.9	8.1	0.62
3	10 24.1	17 11 48.71	21 32 19.6	1.0	8.6	0.66	18	7 15.8	17 4 22.82	21 31 2.9	0.9	8.1	0.62
4	10 19.9	17 11 32.21	21 32 8.5	1.0	8.6	0.66	19	7 11.9	17 4 21.84	21 31 13.4	0.9	8.0	0.62
5	10 15.7	17 11 15.91	21 31 57.8	1.0	8.6	0.66	20	7 7.9	17 4 21.27	21 31 24.5	0.9	8.0	0.62
6	10 11.5	17 10 59.83	-21 31 47.3	1.0	8.6	0.66	21	7 4.0	17 4 21.12	-21 31 36.1	0.9	8.0	0.62
7	10 7.3	17 10 43.08	21 31 37.1	1.0	8.6	0.66	22	7 0.1	17 4 21.38	21 31 48.3	0.9	8.0	0.62
8	10 3.1	17 10 28.37	21 31 27.2	1.0	8.6	0.66	23	6 56.1	17 4 22.04	21 32 1.0	0.9	8.0	0.62
9	9 58.9	17 10 12.99	21 31 17.6	1.0	8.5	0.65	24	6 52.2	17 4 23.12	21 32 14.3	0.9	8.0	0.62
10	9 54.7	17 9 57.87	21 31 8.3	1.0	8.5	0.65	25	6 48.3	17 4 24.61	21 32 28.1	0.9	8.0	0.61
11	9 50.5	17 9 43.01	-21 30 59.4	1.0	8.5	0.65	26	6 44.4	17 4 26.52	-21 32 42.5	0.9	8.0	0.61
12	9 46.4	17 9 28.41	21 30 50.9	1.0	8.5	0.65	27	6 40.5	17 4 28.84	21 32 57.4	0.9	8.0	0.61
13	9 42.2	17 9 14.08	21 30 42.8	1.0	8.5	0.65	28	6 36.6	17 4 31.57	21 33 12.9	0.9	7.9	0.61
14	9 38.0	17 9 0.02	21 30 35.1	1.0	8.5	0.65	29	6 32.8	17 4 34.71	21 33 28.9	0.9	7.9	0.61
15	9 33.9	17 8 46.26	21 30 27.8	1.0	8.5	0.65	30	6 28.9	17 4 38.27	21 33 45.4	0.9	7.9	0.61
16	9 29.7	17 8 32.79	-21 30 20.8	1.0	8.5	0.65	31	6 25.0	17 4 42.24	-21 34 2.5	0.9	7.9	0.61
17	9 25.6	17 8 19.62	21 30 14.2	1.0	8.5	0.65	Sept. 1	6 21.2	17 4 46.62	21 34 20.1	0.9	7.9	0.61
18	9 21.4	17 8 6.74	21 30 8.0	1.0	8.4	0.65	2	6 17.3	17 4 51.42	21 34 38.3	0.9	7.9	0.61
19	9 17.3	17 7 54.17	21 30 2.2	1.0	8.4	0.65	3	6 13.5	17 4 56.63	21 34 57.0	0.9	7.9	0.61
20	9 13.1	17 7 41.92	21 29 56.9	1.0	8.4	0.65	4	6 9.6	17 5 2.26	21 35 16.2	0.9	7.9	0.60
21	9 9.0	17 7 29.99	-21 29 52.1	1.0	8.4	0.65	5	6 5.8	17 5 8.29	-21 35 35.9	0.9	7.8	0.60
22	9 4.9	17 7 18.38	21 29 47.7	1.0	8.4	0.65	6	6 2.0	17 5 14.73	21 35 56.1	0.9	7.8	0.60
23	9 0.8	17 7 7.11	21 29 43.7	1.0	8.4	0.64	7	5 58.1	17 5 21.57	21 36 16.7	0.9	7.8	0.60
24	8 56.6	17 6 56.17	21 29 40.2	1.0	8.4	0.64	8	5 54.3	17 5 28.83	21 36 37.8	0.9	7.8	0.60
25	8 52.5	17 6 45.56	21 29 37.2	1.0	8.4	0.64	9	5 50.5	17 5 36.49	21 36 59.4	0.9	7.8	0.60
26	8 48.4	17 6 35.29	-21 29 34.7	0.9	8.3	0.64	10	5 46.7	17 5 44.55	-21 37 21.5	0.9	7.8	0.59
27	8 44.3	17 6 25.37	21 29 32.7	0.9	8.3	0.64	11	5 43.0	17 5 53.02	21 37 44.0	0.9	7.8	0.59
28	8 40.2	17 6 15.81	21 29 31.2	0.9	8.3	0.64	12	5 39.2	17 6 1.89	21 38 7.0	0.9	7.8	0.59
29	8 36.1	17 6 6.59	21 29 30.1	0.9	8.3	0.64	13	5 35.4	17 6 11.15	21 38 30.4	0.9	7.7	0.59
30	8 32.1	17 5 57.74	21 29 29.6	0.9	8.3	0.64	14	5 31.6	17 6 20.81	21 38 54.2	0.9	7.7	0.59
31	8 28.0	17 5 49.25	-21 29 29.6	0.9	8.3	0.64	15	5 27.8	17 6 30.86	-21 39 18.5	0.9	7.7	0.59
Aug. 1	8 24.0	17 5 41.13	-21 29 30.1	0.9	8.3	0.64	16	5 24.1	17 6 41.30	-21 39 43.2	0.9	7.7	0.59

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Mar. 1	17 44.9	16 24 55.36	21 32 14.0	0.5	1.8	0.13	Apr. 16	14 42.0	16 22 56.34	21 27 53.0	0.5	1.8	0.13
2	17 41.0	16 24 57.68	21 32 19.5	0.5	1.8	0.13	17	14 38.0	16 22 49.17	21 27 36.8	0.5	1.8	0.13
3	17 37.1	16 24 59.77	21 32 24.4	0.5	1.8	0.13	18	14 33.9	16 22 41.85	21 27 20.2	0.5	1.9	0.13
4	17 33.2	16 25 1.64	21 32 28.8	0.5	1.8	0.13	19	14 29.8	16 22 34.38	21 27 3.2	0.5	1.9	0.13
5	17 29.3	16 25 3.28	21 32 32.7	0.5	1.8	0.13	20	14 25.8	16 22 26.75	21 26 45.7	0.5	1.9	0.13
6	17 25.3	16 25 4.68	21 32 36.1	0.5	1.8	0.13	21	14 21.7	16 22 18.98	21 26 28.0	0.5	1.9	0.13
7	17 21.4	16 25 5.84	21 32 39.0	0.5	1.8	0.13	22	14 17.7	16 22 11.07	21 26 9.9	0.5	1.9	0.13
8	17 17.5	16 25 6.78	21 32 41.3	0.5	1.8	0.13	23	14 13.6	16 22 3.02	21 25 51.4	0.5	1.9	0.13
9	17 13.6	16 25 7.50	21 32 43.2	0.5	1.8	0.13	24	14 9.5	16 21 54.82	21 25 32.7	0.5	1.9	0.13
10	17 9.7	16 25 7.99	21 32 44.5	0.5	1.8	0.13	25	14 5.5	16 21 46.50	21 25 13.6	0.5	1.9	0.13
11	17 5.8	16 25 8.26	21 32 45.4	0.5	1.8	0.13	26	14 1.4	16 21 38.05	21 24 54.1	0.5	1.9	0.13
12	17 1.8	16 25 8.30	21 32 45.7	0.5	1.8	0.13	27	13 57.3	16 21 29.47	21 24 34.3	0.5	1.9	0.13
13	16 57.9	16 25 8.12	21 32 45.5	0.5	1.8	0.13	28	13 53.2	16 21 20.77	21 24 14.3	0.5	1.9	0.13
14	16 53.9	16 25 7.71	21 32 44.8	0.5	1.8	0.13	29	13 49.2	16 21 11.95	21 23 54.1	0.5	1.9	0.13
15	16 50.0	16 25 7.07	21 32 43.5	0.5	1.8	0.13	30	13 45.1	16 21 3.02	21 23 33.4	0.5	1.9	0.13
16	16 46.1	16 25 6.21	21 32 41.9	0.5	1.8	0.13	May 1	13 41.0	16 20 53.98	21 23 12.4	0.5	1.9	0.13
17	16 42.1	16 25 5.12	21 32 39.7	0.5	1.8	0.13	2	13 36.9	16 20 44.82	21 22 51.2	0.5	1.9	0.13
18	16 38.2	16 25 3.81	21 32 36.9	0.5	1.8	0.13	3	13 32.8	16 20 35.56	21 22 29.7	0.5	1.9	0.13
19	16 34.2	16 25 2.29	21 32 33.6	0.5	1.8	0.13	4	13 28.7	16 20 26.20	21 22 7.9	0.5	1.9	0.13
20	16 30.2	16 25 0.55	21 32 29.9	0.5	1.8	0.13	5	13 24.6	16 20 16.75	21 21 45.9	0.5	1.9	0.13
21	16 26.3	16 24 58.59	21 32 25.6	0.5	1.8	0.13	6	13 20.6	16 20 7.20	21 21 23.6	0.5	1.9	0.13
22	16 22.3	16 24 56.41	21 32 20.9	0.5	1.8	0.13	7	13 16.5	16 19 57.55	21 21 1.1	0.5	1.9	0.13
23	16 18.3	16 24 54.02	21 32 15.7	0.5	1.8	0.13	8	13 12.4	16 19 47.82	21 20 38.4	0.5	1.9	0.13
24	16 14.4	16 24 51.41	21 32 10.1	0.5	1.8	0.13	9	13 8.3	16 19 38.02	21 20 15.5	0.5	1.9	0.13
25	16 10.4	16 24 48.59	21 32 3.9	0.5	1.8	0.13	10	13 4.2	16 19 28.15	21 19 52.3	0.5	1.9	0.13
26	16 6.4	16 24 45.56	21 31 57.3	0.5	1.8	0.13	11	13 0.1	16 19 18.21	21 19 28.9	0.5	1.9	0.13
27	16 2.4	16 24 42.31	21 31 50.2	0.5	1.8	0.13	12	12 56.0	16 19 8.20	21 19 5.3	0.5	1.9	0.13
28	15 58.4	16 24 38.86	21 31 42.5	0.5	1.8	0.13	13	12 51.9	16 18 58.13	21 18 41.6	0.5	1.9	0.13
29	15 54.4	16 24 35.21	21 31 34.4	0.5	1.8	0.13	14	12 47.8	16 18 47.99	21 18 17.7	0.5	1.9	0.13
30	15 50.4	16 24 31.35	21 31 25.9	0.5	1.8	0.13	15	12 43.7	16 18 37.80	21 17 53.6	0.5	1.9	0.13
31	15 46.4	16 24 27.29	21 31 16.9	0.5	1.8	0.13	16	12 39.6	16 18 27.57	21 17 29.4	0.5	1.9	0.13
Apr. 1	15 42.4	16 24 23.03	21 31 7.5	0.5	1.8	0.13	17	12 35.5	16 18 17.30	21 17 5.1	0.5	1.9	0.13
2	15 38.4	16 24 18.57	21 30 57.7	0.5	1.8	0.13	18	12 31.4	16 18 6.98	21 16 40.7	0.5	1.9	0.13
3	15 34.4	16 24 13.91	21 30 47.3	0.5	1.8	0.13	19	12 27.3	16 17 56.63	21 16 16.1	0.5	1.9	0.13
4	15 30.4	16 24 9.05	21 30 36.4	0.5	1.8	0.13	20	12 23.2	16 17 46.25	21 15 51.4	0.5	1.9	0.13
5	15 26.4	16 24 3.99	21 30 25.1	0.5	1.8	0.13	21	12 19.1	16 17 35.85	21 15 26.6	0.5	1.9	0.13
6	15 22.4	16 23 58.74	21 30 13.4	0.5	1.8	0.13	22	12 15.0	16 17 25.43	21 15 1.7	0.5	1.9	0.13
7	15 18.4	16 23 53.31	21 30 1.3	0.5	1.8	0.13	23	12 10.9	16 17 14.98	21 14 36.7	0.5	1.9	0.13
8	15 14.3	16 23 47.69	21 29 48.7	0.5	1.8	0.13	24	12 6.7	16 17 4.52	21 14 11.7	0.5	1.9	0.13
9	15 10.3	16 23 41.89	21 29 35.6	0.5	1.8	0.13	25	12 2.6	16 16 54.05	21 13 46.6	0.5	1.9	0.13
10	15 6.3	16 23 35.90	21 29 22.1	0.5	1.8	0.13	26	11 58.5	16 16 43.57	21 13 21.4	0.5	1.9	0.13
11	15 2.2	16 23 29.73	21 29 8.2	0.5	1.8	0.13	27	11 54.4	16 16 33.09	21 12 56.2	0.5	1.9	0.13
12	14 58.2	16 23 23.39	21 28 54.0	0.5	1.8	0.13	28	11 50.3	16 16 22.62	21 12 31.0	0.5	1.9	0.13
13	14 54.1	16 23 16.87	21 28 39.3	0.5	1.8	0.13	29	11 46.2	16 16 12.16	21 12 5.8	0.5	1.9	0.13
14	14 50.1	16 23 10.19	21 28 24.2	0.5	1.8	0.13	30	11 42.1	16 16 1.70	21 11 40.5	0.5	1.9	0.13
15	14 46.1	16 23 3.35	21 28 8.8	0.5	1.8	0.13	31	11 38.0	16 15 51.25	21 11 15.2	0.5	1.9	0.13
16	14 42.0	16 22 56.34	21 27 53.0	0.5	1.8	0.13	June 1	11 33.9	16 15 40.83	21 10 49.9	0.5	1.9	0.13

## FOR TRANSIT AT WASHINGTON.

Data.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Data.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
June 1	11 33.9	16 15 40.83	21 10 49.9	0.5	1.9	0.13	July 17	8 26.6	16 9 12.79	20 54 51.0	0.5	1.8	0.13
2	11 29.8	16 15 30.43	21 10 24.6	0.5	1.9	0.13	18	8 22.6	16 9 7.64	20 54 38.2	0.5	1.8	0.13
3	11 25.7	16 15 20.06	21 9 59.3	0.5	1.9	0.13	19	8 18.6	16 9 2.68	20 54 25.9	0.5	1.8	0.13
4	11 21.6	16 15 9.72	21 9 34.1	0.5	1.9	0.13	20	8 14.6	16 8 57.90	20 54 14.2	0.5	1.8	0.13
5	11 17.5	16 14 59.43	21 9 9.0	0.5	1.9	0.13	21	8 10.6	16 8 53.31	20 54 3.0	0.5	1.8	0.13
6	11 13.4	16 14 49.17	21 8 44.0	0.5	1.9	0.13	22	8 6.6	16 8 48.91	20 53 52.2	0.5	1.8	0.13
7	11 9.3	16 14 38.95	21 8 19.1	0.5	1.9	0.13	23	8 2.6	16 8 44.70	20 53 41.9	0.5	1.8	0.13
8	11 5.2	16 14 28.79	21 7 54.3	0.5	1.9	0.13	24	7 58.6	16 8 40.68	20 53 32.2	0.5	1.8	0.13
9	11 1.1	16 14 18.69	21 7 29.6	0.5	1.9	0.13	25	7 54.6	16 8 36.86	20 53 23.0	0.5	1.8	0.13
10	10 57.0	16 14 8.65	21 7 5.0	0.5	1.9	0.13	26	7 50.6	16 8 33.23	20 53 14.3	0.5	1.8	0.13
11	10 52.9	16 13 58.66	21 6 40.5	0.5	1.9	0.13	27	7 46.6	16 8 29.80	20 53 6.1	0.5	1.8	0.13
12	10 48.8	16 13 48.74	21 6 16.2	0.5	1.9	0.13	28	7 42.6	16 8 26.58	20 52 58.4	0.5	1.8	0.13
13	10 44.7	16 13 38.90	21 5 52.0	0.5	1.9	0.13	29	7 38.6	16 8 23.55	20 52 51.2	0.5	1.8	0.13
14	10 40.6	16 13 29.13	21 5 27.9	0.5	1.9	0.13	30	7 34.6	16 8 20.72	20 52 44.6	0.5	1.8	0.13
15	10 36.5	16 13 19.44	21 5 4.0	0.5	1.9	0.13	31	7 30.7	16 8 18.10	20 52 38.5	0.5	1.8	0.13
16	10 32.4	16 13 9.84	21 4 40.4	0.5	1.9	0.13	Aug. 1	7 26.7	16 8 15.68	20 52 33.0	0.5	1.8	0.13
17	10 28.3	16 13 0.33	21 4 16.9	0.5	1.9	0.13	2	7 22.7	16 8 13.47	20 52 28.0	0.5	1.8	0.13
18	10 24.2	16 12 50.92	21 3 53.6	0.5	1.9	0.13	3	7 18.7	16 8 11.47	20 52 23.5	0.5	1.8	0.13
19	10 20.2	16 12 41.60	21 3 30.5	0.5	1.9	0.13	4	7 14.8	16 8 9.67	20 52 19.6	0.5	1.8	0.13
20	10 16.1	16 12 32.37	21 3 7.7	0.5	1.9	0.13	5	7 10.8	16 8 8.09	20 52 16.3	0.5	1.8	0.13
21	10 12.0	16 12 23.25	21 2 45.1	0.5	1.9	0.13	6	7 6.9	16 8 6.72	20 52 13.6	0.5	1.8	0.13
22	10 7.9	16 12 14.23	21 2 22.7	0.5	1.9	0.13	7	7 2.9	16 8 5.56	20 52 11.5	0.5	1.8	0.13
23	10 3.8	16 12 5.32	21 2 0.6	0.5	1.9	0.13	8	6 59.0	16 8 4.62	20 52 9.9	0.5	1.8	0.13
24	9 59.8	16 11 56.52	21 1 38.7	0.5	1.9	0.13	9	6 55.0	16 8 3.89	20 52 8.8	0.5	1.8	0.13
25	9 55.7	16 11 47.84	21 1 17.1	0.5	1.9	0.13	10	6 51.1	16 8 3.37	20 52 8.3	0.5	1.8	0.13
26	9 51.6	16 11 39.28	21 0 55.8	0.5	1.9	0.13	11	6 47.2	16 8 3.07	20 52 8.3	0.5	1.8	0.13
27	9 47.5	16 11 30.85	21 0 34.8	0.5	1.9	0.13	12	6 43.2	16 8 2.98	20 52 8.9	0.5	1.8	0.13
28	9 43.5	16 11 22.53	21 0 14.1	0.5	1.9	0.13	13	6 39.3	16 8 3.11	20 52 10.1	0.5	1.8	0.13
29	9 39.4	16 11 14.34	20 59 53.7	0.5	1.9	0.13	14	6 35.4	16 8 3.45	20 52 12.0	0.5	1.8	0.13
30	9 35.3	16 11 6.29	20 59 33.6	0.5	1.9	0.13	15	6 31.4	16 8 4.02	20 52 14.4	0.5	1.8	0.13
July 1	9 31.3	16 10 58.37	20 59 13.9	0.5	1.9	0.13	16	6 27.5	16 8 4.80	20 52 17.4	0.5	1.8	0.13
2	9 27.2	16 10 50.60	20 58 54.6	0.5	1.9	0.13	17	6 23.6	16 8 5.78	20 52 20.9	0.5	1.8	0.13
3	9 23.2	16 10 42.98	20 58 35.6	0.5	1.9	0.13	18	6 19.7	16 8 6.98	20 52 25.0	0.5	1.8	0.13
4	9 19.1	16 10 35.50	20 58 16.9	0.5	1.9	0.13	19	6 15.8	16 8 8.40	20 52 29.7	0.5	1.8	0.13
5	9 15.0	16 10 28.15	20 57 58.6	0.5	1.9	0.13	20	6 11.9	16 8 10.03	20 52 35.0	0.5	1.8	0.13
6	9 11.0	16 10 20.95	20 57 40.7	0.5	1.9	0.13	21	6 8.0	16 8 11.88	20 52 40.8	0.5	1.8	0.13
7	9 6.9	16 10 13.91	20 57 23.2	0.5	1.8	0.13	22	6 4.1	16 8 13.95	20 52 47.2	0.5	1.8	0.13
8	9 2.9	16 10 7.04	20 57 6.1	0.5	1.8	0.13	23	6 0.2	16 8 16.24	20 52 54.1	0.5	1.8	0.13
9	8 58.9	16 10 0.33	20 56 49.3	0.5	1.8	0.13	24	5 56.3	16 8 18.74	20 53 1.6	0.5	1.8	0.13
10	8 54.8	16 9 53.78	20 56 33.1	0.5	1.8	0.13	25	5 52.4	16 8 21.45	20 53 9.7	0.5	1.8	0.13
11	8 50.8	16 9 47.40	20 56 17.3	0.5	1.8	0.13	26	5 48.5	16 8 24.37	20 53 18.4	0.5	1.8	0.13
12	8 46.7	16 9 41.20	20 56 1.8	0.5	1.8	0.13	27	5 44.7	16 8 27.51	20 53 27.6	0.5	1.8	0.13
13	8 42.7	16 9 35.17	20 55 46.7	0.5	1.8	0.13	28	5 40.8	16 8 30.86	20 53 37.4	0.5	1.8	0.13
14	8 38.7	16 9 29.31	20 55 32.1	0.5	1.8	0.13	29	5 36.9	16 8 34.42	20 53 47.7	0.5	1.8	0.13
15	8 34.7	16 9 23.63	20 55 18.0	0.5	1.8	0.13	30	5 33.0	16 8 38.20	20 53 58.6	0.5	1.8	0.13
16	8 30.6	16 9 18.12	20 55 4.3	0.5	1.8	0.13	31	5 29.2	16 8 42.19	20 54 10.1	0.5	1.8	0.13
17	8 26.6	16 9 12.79	20 54 51.0	0.5	1.8	0.13	Sept. 1	5 25.3	16 8 46.39	20 54 22.1	0.5	1.8	0.13

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	10 47.1	5 29 25.67	+21 54 59.4	0.3	1.3	0.10	Feb 14	7 46.4	5 25 42.44	+21 53 47.4	0.3	1.3	0.09
1	10 43.0	5 29 18.80	21 54 55.7	0.3	1.3	0.10	15	7 42.5	5 25 40.16	21 53 48.5	0.3	1.3	0.09
2	10 39.0	5 29 11.98	21 54 52.0	0.3	1.3	0.10	16	7 38.5	5 25 38.03	21 53 49.7	0.3	1.3	0.09
3	10 34.9	5 29 5.22	21 54 48.4	0.3	1.3	0.10	17	7 34.5	5 25 36.04	21 53 51.0	0.3	1.3	0.09
4	10 30.9	5 28 58.51	21 54 44.9	0.3	1.3	0.10	18	7 30.6	5 25 34.18	21 53 52.4	0.3	1.3	0.09
5	10 26.8	5 28 51.86	+21 54 41.5	0.3	1.3	0.10	19	7 26.6	5 25 32.47	+21 53 54.0	0.3	1.3	0.09
6	10 22.8	5 28 45.27	21 54 38.1	0.3	1.3	0.10	20	7 22.6	5 25 30.90	21 53 55.8	0.3	1.3	0.09
7	10 18.8	5 28 38.74	21 54 34.8	0.3	1.3	0.10	21	7 18.7	5 25 29.47	21 53 57.7	0.3	1.3	0.09
8	10 14.7	5 28 32.29	21 54 31.6	0.3	1.3	0.10	22	7 14.7	5 25 28.18	21 53 59.7	0.3	1.3	0.09
9	10 10.7	5 28 25.91	21 54 28.5	0.3	1.3	0.10	23	7 10.8	5 25 27.04	21 54 1.9	0.3	1.3	0.09
10	10 6.7	5 28 19.61	+21 54 25.5	0.3	1.3	0.10	24	7 6.8	5 25 26.04	+21 54 4.2	0.3	1.3	0.09
11	10 2.6	5 28 13.38	21 54 22.6	0.3	1.3	0.10	25	7 2.9	5 25 25.19	21 54 6.6	0.3	1.3	0.09
12	9 58.6	5 28 7.23	21 54 19.8	0.3	1.3	0.10	26	6 59.0	5 25 24.49	21 54 9.1	0.3	1.3	0.09
13	9 54.5	5 28 1.16	21 54 17.1	0.3	1.3	0.10	27	6 55.0	5 25 23.93	21 54 11.7	0.3	1.3	0.09
14	9 50.5	5 27 55.18	21 54 14.4	0.3	1.3	0.10	28	6 51.1	5 25 23.51	21 54 14.5	0.3	1.3	0.09
15	9 46.5	5 27 49.28	+21 54 11.8	0.3	1.3	0.10	Mar. 1	6 47.1	5 25 23.24	+21 54 17.4	0.3	1.3	0.09
16	9 42.5	5 27 43.47	21 54 9.3	0.3	1.3	0.10	2	6 43.2	5 25 23.12	21 54 20.4	0.3	1.3	0.09
17	9 38.4	5 27 37.75	21 54 7.0	0.3	1.3	0.10	3	6 39.3	5 25 23.15	21 54 23.6	0.3	1.3	0.09
18	9 34.4	5 27 32.13	21 54 4.8	0.3	1.3	0.10	4	6 35.3	5 25 23.32	21 54 26.9	0.3	1.3	0.09
19	9 30.4	5 27 26.60	21 54 2.7	0.3	1.3	0.10	5	6 31.4	5 25 23.63	21 54 30.3	0.3	1.3	0.09
20	9 26.4	5 27 21.17	+21 54 0.7	0.3	1.3	0.10	6	6 27.5	5 25 24.09	+21 54 33.8	0.3	1.3	0.09
21	9 22.3	5 27 15.84	21 53 58.8	0.3	1.3	0.10	7	6 23.6	5 25 24.70	21 54 37.5	0.3	1.3	0.09
22	9 18.3	5 27 10.60	21 53 57.0	0.3	1.3	0.09	8	6 19.7	5 25 25.46	21 54 41.3	0.3	1.3	0.09
23	9 14.3	5 27 5.47	21 53 55.3	0.3	1.3	0.09	9	6 15.7	5 25 26.36	21 54 45.2	0.3	1.3	0.09
24	9 10.3	5 27 0.45	21 53 53.6	0.3	1.3	0.09	10	6 11.8	5 25 27.41	21 54 49.2	0.3	1.3	0.09
25	9 6.3	5 26 55.54	+21 53 52.0	0.3	1.3	0.09	11	6 7.9	5 25 28.61	+21 54 53.3	0.3	1.3	0.09
26	9 2.3	5 26 50.73	21 53 50.6	0.3	1.3	0.09	12	6 4.0	5 25 29.96	21 54 57.5	0.3	1.3	0.09
27	8 58.3	5 26 46.03	21 53 49.4	0.3	1.3	0.09	13	6 0.1	5 25 31.46	21 55 1.8	0.3	1.3	0.09
28	8 54.3	5 26 41.44	21 53 48.3	0.3	1.3	0.09	14	5 56.2	5 25 33.10	21 55 6.3	0.3	1.3	0.09
29	8 50.3	5 26 36.97	21 53 47.3	0.3	1.3	0.09	15	5 52.3	5 25 34.89	21 55 11.0	0.3	1.3	0.09
30	8 46.3	5 26 32.63	+21 53 46.4	0.3	1.3	0.09	Sept. 16	18 2.3	5 46 57.95	+22 8 50.2	0.3	1.3	0.09
31	8 42.3	5 26 28.40	21 53 45.6	0.3	1.3	0.09	17	17 58.4	5 46 59.73	22 8 48.7	0.3	1.3	0.09
Feb. 1	8 38.3	5 26 24.29	21 53 44.9	0.3	1.3	0.09	18	17 54.5	5 47 1.37	22 8 47.1	0.3	1.3	0.09
2	8 34.3	5 26 20.30	21 53 44.3	0.3	1.3	0.09	19	17 50.6	5 47 2.86	22 8 45.4	0.3	1.3	0.09
3	8 30.3	5 26 16.43	21 53 43.8	0.3	1.3	0.09	20	17 46.7	5 47 4.21	22 8 43.7	0.3	1.3	0.09
4	8 26.3	5 26 12.68	+21 53 43.4	0.3	1.3	0.09	21	17 42.7	5 47 5.42	+22 8 41.9	0.3	1.3	0.09
5	8 22.3	5 26 9.06	21 53 43.2	0.3	1.3	0.09	22	17 38.8	5 47 6.48	22 8 40.1	0.3	1.3	0.09
6	8 18.3	5 26 5.57	21 53 43.2	0.3	1.3	0.09	23	17 34.9	5 47 7.40	22 8 38.2	0.3	1.3	0.09
7	8 14.3	5 26 2.21	21 53 43.3	0.3	1.3	0.09	24	17 31.0	5 47 8.18	22 8 36.2	0.3	1.3	0.09
8	8 10.3	5 25 58.98	21 53 43.5	0.3	1.3	0.09	25	17 27.1	5 47 8.81	22 8 34.2	0.3	1.3	0.09
9	8 6.3	5 25 55.89	+21 53 43.8	0.3	1.3	0.09	26	17 23.1	5 47 9.29	+22 8 32.2	0.3	1.3	0.09
10	8 2.3	5 25 52.93	21 53 44.3	0.3	1.3	0.09	27	17 19.2	5 47 9.62	22 8 30.2	0.3	1.3	0.09
11	7 58.4	5 25 50.11	21 53 44.9	0.3	1.3	0.09	28	17 15.3	5 47 9.81	22 8 28.1	0.3	1.3	0.09
12	7 54.4	5 25 47.42	21 53 45.6	0.3	1.3	0.09	29	17 11.4	5 47 9.86	22 8 26.0	0.3	1.3	0.09
13	7 50.4	5 25 44.86	21 53 46.4	0.3	1.3	0.09	30	17 7.4	5 47 9.76	22 8 23.9	0.3	1.3	0.09
14	7 46.4	5 25 42.44	+21 53 47.4	0.3	1.3	0.09	Oct. 1	17 3.5	5 47 9.52	+22 8 21.7	0.3	1.3	0.09
15	7 42.5	5 25 40.16	+21 53 48.5	0.3	1.3	0.09	2	16 59.5	5 47 9.13	+22 8 19.4	0.3	1.3	0.09

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	17 3.5	5 47 9.52	+22 8 21.7	0.3	1.3	0.09	Nov. 16	14 0.1	5 44 34.32	+22 6 11.3	0.3	1.3	0.10
2	16 59.5	5 47 9.13	22 8 19.4	0.3	1.3	0.09	17	13 56.0	5 44 28.31	22 6 8.1	0.3	1.3	0.10
3	16 55.6	5 47 8.60	22 8 17.1	0.3	1.3	0.09	18	13 52.0	5 44 22.21	22 6 4.8	0.3	1.3	0.10
4	16 51.7	5 47 7.92	22 8 14.8	0.3	1.3	0.09	19	13 48.0	5 44 16.04	22 6 1.6	0.3	1.3	0.10
5	16 47.7	5 47 7.11	22 8 12.5	0.3	1.3	0.09	20	13 43.9	5 44 9.79	22 5 58.3	0.3	1.3	0.10
6	16 43.8	5 47 6.15	22 8 10.1	0.3	1.3	0.09	21	13 39.9	5 44 3.46	+22 5 55.1	0.3	1.3	0.10
7	16 39.8	5 47 5.04	22 8 7.7	0.3	1.3	0.09	22	13 35.8	5 43 57.06	22 5 51.9	0.3	1.3	0.10
8	16 35.9	5 47 3.79	22 8 5.2	0.3	1.3	0.09	23	13 31.8	5 43 50.59	22 5 48.7	0.3	1.3	0.10
9	16 31.9	5 47 2.40	22 8 2.7	0.3	1.3	0.09	24	13 27.8	5 43 44.06	22 5 45.5	0.3	1.3	0.10
10	16 28.0	5 47 0.87	22 8 0.2	0.3	1.3	0.09	25	13 23.7	5 43 37.46	22 5 42.3	0.3	1.3	0.10
11	16 24.0	5 46 59.20	+22 7 57.7	0.3	1.3	0.09	26	13 19.7	5 43 30.72	+22 5 39.1	0.3	1.3	0.10
12	16 20.0	5 46 57.39	22 7 55.1	0.3	1.3	0.09	27	13 15.6	5 43 24.06	22 5 35.9	0.3	1.3	0.10
13	16 16.1	5 46 55.43	22 7 52.5	0.3	1.3	0.09	28	13 11.6	5 43 17.27	22 5 32.7	0.3	1.3	0.10
14	16 12.1	5 46 53.34	22 7 49.9	0.3	1.3	0.09	29	13 7.5	5 43 10.43	22 5 29.5	0.3	1.3	0.10
15	16 8.1	5 46 51.11	22 7 47.3	0.3	1.3	0.09	30	13 3.5	5 43 3.53	22 5 26.4	0.3	1.3	0.10
16	16 4.2	5 46 48.74	+22 7 44.6	0.3	1.3	0.09	Dec. 1	12 59.4	5 42 56.58	+22 5 23.2	0.3	1.3	0.10
17	16 0.2	5 46 46.24	22 7 41.9	0.3	1.3	0.09	2	12 55.4	5 42 49.59	22 5 20.0	0.3	1.3	0.10
18	15 56.2	5 46 43.61	22 7 39.2	0.3	1.3	0.09	3	12 51.3	5 42 42.56	22 5 16.9	0.3	1.3	0.10
19	15 52.2	5 46 40.85	22 7 36.4	0.3	1.3	0.09	4	12 47.3	5 42 35.49	22 5 13.8	0.3	1.3	0.10
20	15 48.3	5 46 37.95	22 7 33.6	0.3	1.3	0.09	5	12 43.2	5 42 28.38	22 5 10.7	0.3	1.3	0.10
21	15 44.3	5 46 34.91	+22 7 30.8	0.3	1.3	0.09	6	12 39.2	5 42 21.24	+22 5 7.6	0.3	1.3	0.10
22	15 40.3	5 46 31.74	22 7 28.0	0.3	1.3	0.09	7	12 35.1	5 42 14.07	22 5 4.5	0.3	1.3	0.10
23	15 36.3	5 46 28.44	22 7 25.1	0.3	1.3	0.09	8	12 31.1	5 42 6.87	22 5 1.4	0.3	1.3	0.10
24	15 32.3	5 46 25.01	22 7 22.2	0.3	1.3	0.09	9	12 27.0	5 41 59.65	22 4 58.4	0.3	1.3	0.10
25	15 28.3	5 46 21.46	22 7 19.3	0.3	1.3	0.09	10	12 23.0	5 41 52.40	22 4 55.4	0.3	1.3	0.10
26	15 24.3	5 46 17.78	+22 7 16.4	0.3	1.3	0.09	11	12 18.9	5 41 45.13	+22 4 52.4	0.3	1.3	0.10
27	15 20.3	5 46 13.98	22 7 13.4	0.3	1.3	0.09	12	12 14.9	5 41 37.84	22 4 49.4	0.3	1.3	0.10
28	15 16.3	5 46 10.06	22 7 10.4	0.3	1.3	0.09	13	12 10.8	5 41 30.54	22 4 46.3	0.3	1.3	0.10
29	15 12.3	5 46 6.02	22 7 7.4	0.3	1.3	0.09	14	12 6.8	5 41 23.24	22 4 43.5	0.3	1.3	0.10
30	15 8.3	5 46 1.85	22 7 4.4	0.3	1.3	0.09	15	12 2.7	5 41 15.93	22 4 40.6	0.3	1.3	0.10
31	15 4.3	5 45 57.56	+22 7 1.4	0.3	1.3	0.09	16	11 58.7	5 41 8.61	+22 4 37.7	0.3	1.3	0.10
Nov. 1	15 0.3	5 45 53.16	22 6 58.4	0.3	1.3	0.09	17	11 54.6	5 41 1.29	22 4 34.8	0.3	1.3	0.10
2	14 56.3	5 45 48.64	22 6 55.4	0.3	1.3	0.09	18	11 50.6	5 40 53.97	22 4 32.0	0.3	1.3	0.10
3	14 52.3	5 45 44.00	22 6 52.3	0.3	1.3	0.09	19	11 46.5	5 40 46.65	22 4 29.2	0.3	1.3	0.10
4	14 48.3	5 45 39.26	22 6 49.2	0.3	1.3	0.09	20	11 42.5	5 40 39.34	22 4 26.4	0.3	1.3	0.10
5	14 44.3	5 45 34.41	+22 6 46.1	0.3	1.3	0.09	21	11 38.4	5 40 32.04	+22 4 23.6	0.3	1.3	0.10
6	14 40.3	5 45 29.46	22 6 43.0	0.3	1.3	0.09	22	11 34.3	5 40 24.75	22 4 20.9	0.3	1.3	0.10
7	14 36.3	5 45 24.39	22 6 39.9	0.3	1.3	0.09	23	11 30.3	5 40 17.48	22 4 18.2	0.3	1.3	0.10
8	14 32.3	5 45 19.22	22 6 36.8	0.3	1.3	0.09	24	11 26.2	5 40 10.22	22 4 15.6	0.3	1.3	0.10
9	14 28.2	5 45 13.94	22 6 33.6	0.3	1.3	0.10	25	11 22.2	5 40 2.98	22 4 13.0	0.3	1.3	0.10
10	14 24.2	5 45 8.56	+22 6 30.4	0.3	1.3	0.10	26	11 18.1	5 39 55.77	+22 4 10.4	0.3	1.3	0.10
11	14 20.2	5 45 3.09	22 6 27.3	0.3	1.3	0.10	27	11 14.1	5 39 48.59	22 4 7.9	0.3	1.3	0.10
12	14 16.2	5 44 57.52	22 6 24.1	0.3	1.3	0.10	28	11 10.0	5 39 41.44	22 4 5.5	0.3	1.3	0.10
13	14 12.1	5 44 51.86	22 6 20.9	0.3	1.3	0.10	29	11 6.0	5 39 34.32	22 4 3.1	0.3	1.3	0.10
14	14 8.1	5 44 46.10	22 6 17.7	0.3	1.3	0.10	30	11 1.9	5 39 27.24	22 4 0.8	0.3	1.3	0.10
15	14 4.1	5 44 40.25	+22 6 14.5	0.3	1.3	0.10	31	10 57.9	5 39 20.20	+22 3 58.5	0.3	1.3	0.10
16	14 0.1	5 44 34.32	+22 6 11.3	0.3	1.3	0.10	32	10 53.8	5 39 13.19	+22 3 56.2	0.3	1.3	0.10

# PART III

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## PHENOMENA

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### ECLIPSES, 1899.

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In the year 1899 there will be five eclipses, three of the sun and two of the moon.

I.—*A Partial Eclipse of the Sun*, 1899, January 11, invisible at Washington.

#### ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, January 11 11 8 59.3			
Sun and moon's R. A.	19 33 16.86	Hourly motions	10.83 and 158.45
Sun's declination	21 43 18.0 S.	Hourly motion	0 24.1 N.
Moon's declination	20 30 4.0 S.	Hourly motion	9 23.9 N.
Sun's equa. hor. parallax	8.9	Sun's true semidiameter	16 15.9
Moon's equa. hor. parallax	61 27.2	Moon's true semidiameter	16 43.9

#### CIRCUMSTANCES OF THE ECLIPSE.

		Longitude from Greenwich.	Latitude.
Eclipse begins	January 11 8 53.7	152 51.5 E.	31 37.4 N.
Middle of the eclipse	11 10 38.0	167 41.4 E.	64 5.3 N.
Eclipse ends	11 12 22.1	130 4.9 W.	56 16.9 N.

Magnitude of greatest eclipse = 0.715 (sun's diameter = 1.0).

II.—*A Partial Eclipse of the Sun*, 1899, June 7, invisible at Washington.

#### ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, June 7 18 33 42.8			
Sun and moon's R. A.	5 4 26.81	Hourly motions	10.33 and 136.60
Sun's declination	22 50 16.1 N.	Hourly motion	0 13.7 N.
Moon's declination	23 57 3.7 N.	Hourly motion	0 10.6 N.
Sun's equa. hor. parallax	8.7	Sun's true semidiameter	15 45.3
Moon's equa. hor. parallax	55 24.6	Moon's true semidiameter	15 5.2

#### CIRCUMSTANCES OF THE ECLIPSE.

		Longitude from Greenwich.	Latitude.
Eclipse begins	June 7 16 41.1	6 16.7 W.	45 50.6 N.
Greatest eclipse	7 18 33.9	98 56.1 W.	67 9.9 N.
Eclipse ends	7 20 26.7	168 37.6 E.	45 44.6 N.

Magnitude of greatest eclipse = 0.608 (sun's diameter = 1.0).

III.—*A Total Eclipse of the Moon*, 1899, June 22–23, invisible at Washington, but visible generally:—the beginning, in the eastern portions of Asia and throughout the Pacific Ocean and the western portions of North America; and the end, in Asia, the eastern portions of Africa, and the middle and western Pacific Ocean.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, June 23				d	h	m	s
				23	2	20	25.8
Sun's right ascension	6	8	4.04	Hourly motion	10.39		
Moon's right ascension	18	8	4.04	Hourly motion	160.22		
Sun's declination	23	26	20.9 N.	Hourly motion	0	2.0	S.
Moon's declination	23	13	9.4 S.	Hourly motion	3	55.5	N.
Sun's equa. hor. parallax	8.7			Sun's true semidiameter	15	44.2	
Moon's equa. hor. parallax	60	25.2		Moon's true semidiameter	16	27.0	

## TIMES OF THE PHASES.

	June	d	h	m	
Moon enters penumbra	22	23	36.4	} Greenwich Mean Time.	
Moon enters shadow	23	0	32.9		
Total eclipse begins	23	1	32.8		
Middle of the eclipse	23	2	17.9		
Total eclipse ends	23	3	2.9		
Moon leaves shadow	23	4	2.7		
Moon leaves penumbra	23	4	59.5		

## CIRCUMSTANCES OF THE ECLIPSE.

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich		and in latitude.
First	96° to E.	171	8 E.	23° 20' S.
Last	109 to W.	120	53 E.	23 6 S.

Magnitude of the eclipse = 1.488 (moon's diameter = 1.0).

IV.—*An Annular Eclipse of the Sun*, 1899, December 2, invisible at Washington.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, December				<sup>d</sup> 2	<sup>h</sup> 13	<sup>m</sup> 1	<sup>s</sup> 49.0
Sun and moon's R. A.	16	<sup>h</sup> 36	<sup>m</sup> 20.81	Hourly motions		10.84	and 149.29
Sun's declination	22	<sup>s</sup> 3	33.8 S.	Hourly motion		0	21.6 S.
Moon's declination	22	56	13.6 S.	Hourly motion		1	46.9 S.
Sun's equa. hor. parallax	8.9			Sun's true semidiameter		16	13.9
Moon's equa. hor. parallax	58	12.3		Moon's true semidiameter		15	50.8

## CIRCUMSTANCES OF THE ECLIPSE.

		d	h	m	Longitude from Greenwich.	Latitude.
Eclipse begins	December	2	10	39.8	93 36.7 E.	30° 36.8 S.
Central eclipse begins		2	12	11.9	48 12.6 E.	55 35.3 S.
Central eclipse at noon		2	13	1.8	161 58.5 E.	87 36.6 S.
Central eclipse ends		2	13	43.0	75 31.3 W.	59 10.8 S.
Eclipse ends		2	15	15.0	124 43.8 W.	35 7.2 S.

V.—*A Partial Eclipse of the Moon*, 1899, December 16, visible at Washington; the beginning visible generally throughout the eastern portion of North America, Europe, Asia and Africa; and the ending generally throughout the whole of North America, South America, Europe and Africa.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, December				<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>
				16	13	29	0.4
Sun's right ascension	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	17	37	54.97	
Moon's right ascension	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	5	37	54.97	
Sun's declination	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	23	21	16.3	S.
Moon's declination	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	22	55	37.3	N.
Sun's equa. hor. parallax						8.9	
Moon's equa. hor. parallax				56	10.6		
Hourly motion							11.08
Hourly motion							139.17
Hourly motion							0' 5.9 S.
Hourly motion							1 43.2 S.
Sun's true semidiameter				16	15.5		
Moon's true semidiameter				15	17.7		

## TIMES OF THE PHASES.

	December	<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	
Moon enters penumbra		16	10	32.9	} Greenwich Mean Time.
Moon enters shadow		16	11	44.9	
Middle of the eclipse		16	13	26.0	
Moon leaves shadow		16	15	6.7	
Moon leaves penumbra		16	16	18.8	

## CIRCUMSTANCES OF THE ECLIPSE.

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich	and in latitude.
First	66° to E.	1° 52' E.	22° 58' N.
Last	59 to W.	46 47 W.	22 53 N.

Magnitude of the eclipse = 0.996 (moon's diameter = 1.0).

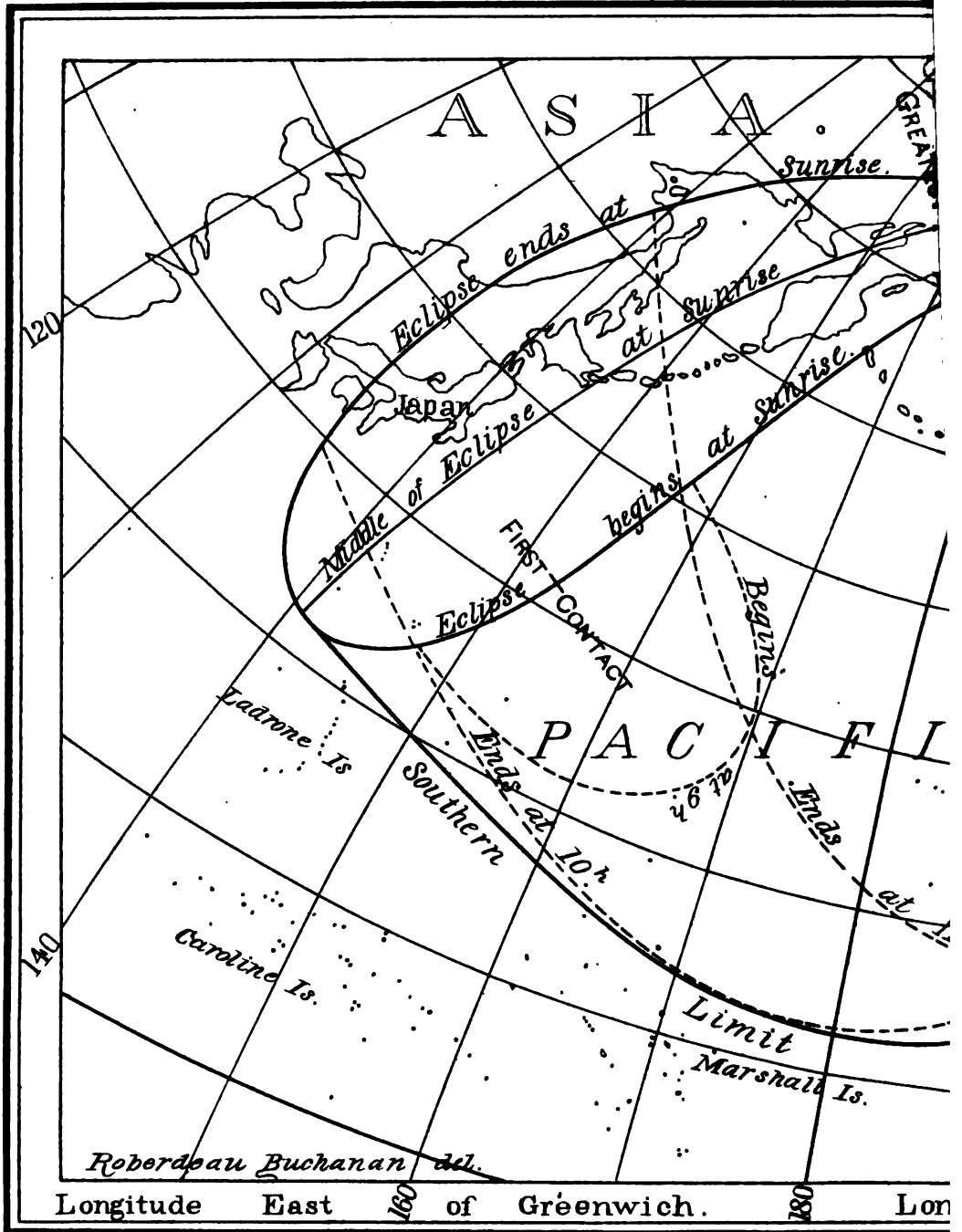
The regions within which the eclipses of the sun are visible, are laid down on the accompanying charts; from which, by means of the dotted lines, the Greenwich times of beginning and ending may be found within a few minutes.



BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1899, JANUARY 11.						
Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	<i>x</i>	<i>y</i>	Log sin <i>d</i>	Log cos <i>d</i>	<i>μ</i>	
<sup>h</sup> <sup>m</sup> 8 50	−1.30638	+0.85523	−9.56865	+9.96797	130° 25.2	+0.53816
9 0	−1.21238	+0.87961	−9.56863	+9.96797	132 55.2	+0.53817
10	1.11838	0.90399	9.56861	9.96797	135 25.1	0.53817
20	1.02439	0.92838	9.56859	9.96797	137 55.1	0.53818
30	0.93040	0.95278	9.56857	9.96797	140 25.1	0.53818
40	0.83641	0.97718	9.56855	9.96798	142 55.1	0.53819
50	0.74242	1.00159	9.56853	9.96798	145 25.0	0.53819
10 0	−0.64843	+1.02600	−9.56851	+9.96798	147 55.0	+0.53819
10	0.55443	1.05041	9.56849	9.96798	150 25.0	0.53819
20	0.46044	1.07483	9.56847	9.96799	152 55.0	0.53819
30	0.36645	1.09926	9.56845	9.96799	155 24.9	0.53819
40	0.27246	1.12369	9.56843	9.96799	157 54.9	0.53819
50	0.17847	1.14813	9.56841	9.96800	160 24.9	0.53819
11 0	−0.08448	+1.17257	−9.56839	+9.96800	162 54.9	+0.53819
10	+0.00951	1.19701	9.56837	9.96800	165 24.8	0.53819
20	0.10349	1.22146	9.56835	9.96801	167 54.8	0.53818
30	0.19747	1.24592	9.56833	9.96801	170 24.8	0.53818
40	0.29145	1.27038	9.56831	9.96801	172 54.8	0.53817
50	0.38542	1.29485	9.56829	9.96802	175 24.7	0.53817
12 0	+0.47939	+1.31932	−9.56827	+9.96802	177 54.7	+0.53816
10	0.57335	1.34379	9.56825	9.96802	180 24.7	0.53815
20	0.66731	1.36827	9.56823	9.96803	182 54.6	0.53814
30	+0.76127	+1.39275	−9.56821	+9.96803	185 24.6	+0.53813
Greenwich Mean Time.	Log Δ <i>x</i> for 1 Minute.		Log Δ <i>y</i> for 1 Minute.		Log Δ <i>μ</i> for 1 Minute.	Log Tangent of Angle of Cone—
						Penumbra.
<sup>h</sup> <sup>m</sup> 9 0	+7.9731		+7.3871		+1.1760	+7.67709
10 0	7.9731		7.3876		1.1760	7.67709
11 0	7.9731		7.3882		1.1760	7.67709
12 0	7.9730		7.3887		1.1760	7.67709
13 0	+7.9729		+7.3892		+1.1760	+7.67709

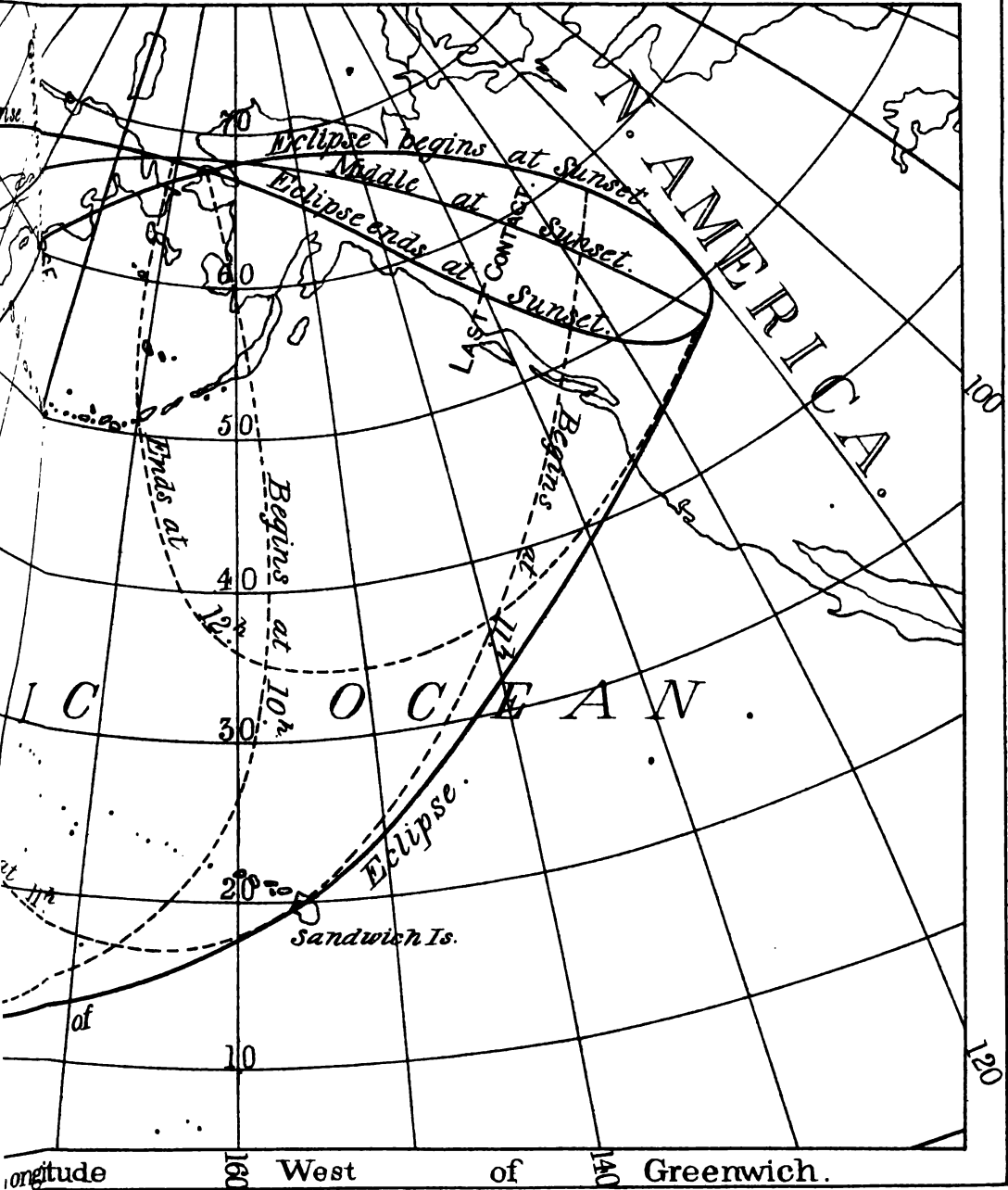


# PARTIAL ECLIPSE



Note.— The hours of beginning and end

SE. JANUARY 11<sup>TH</sup> 1899.

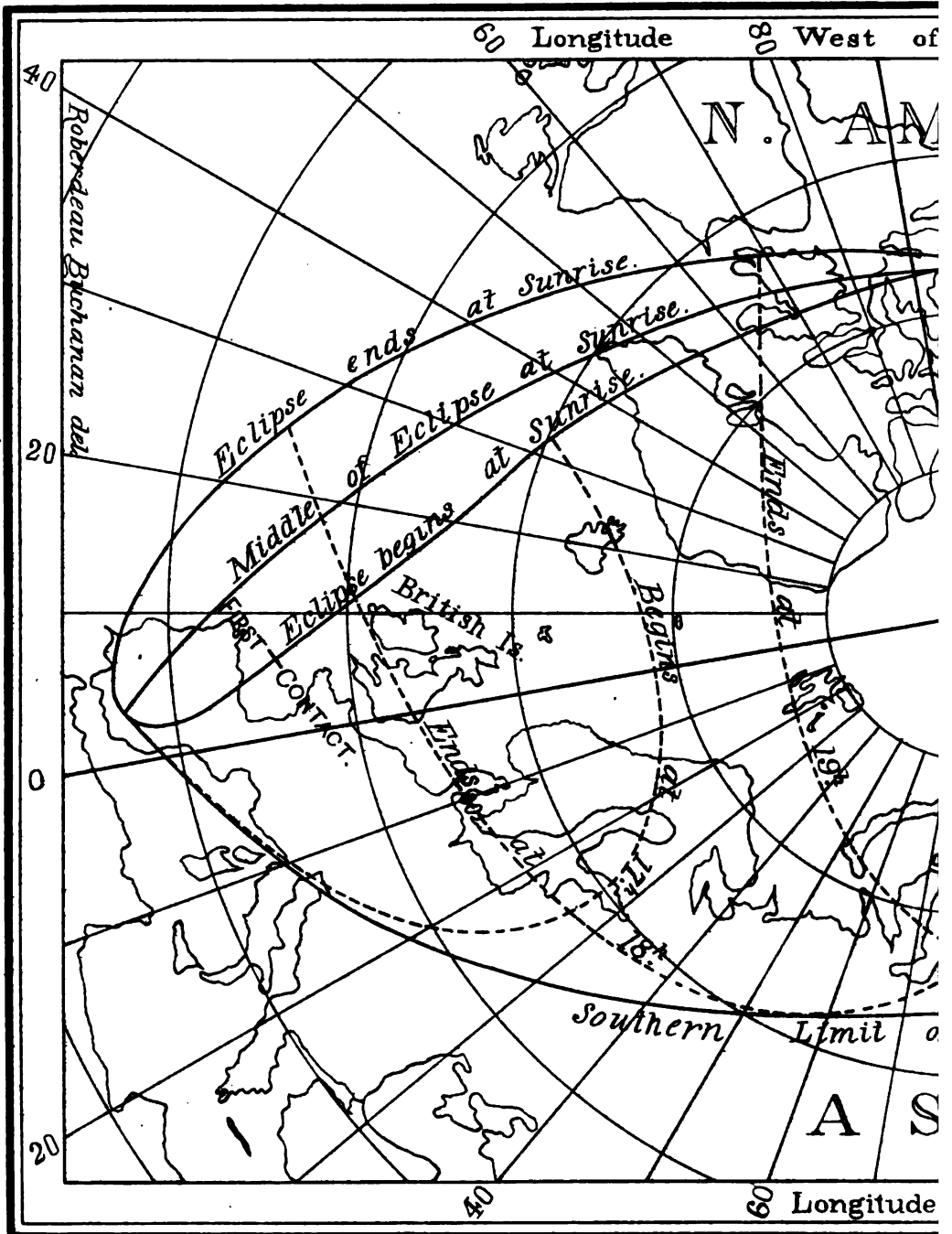


ending are expressed in Greenwich Mean Time.



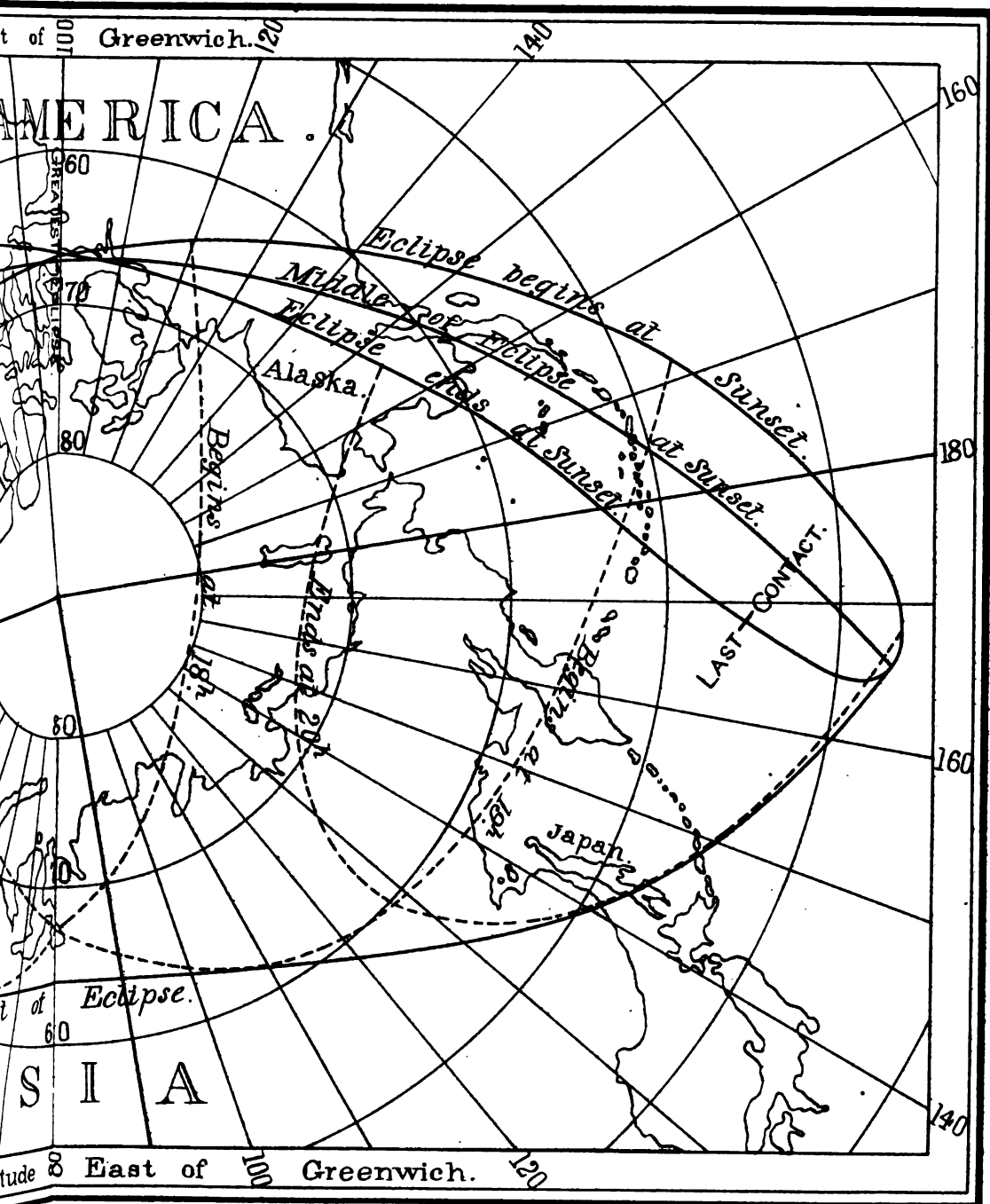


# PARTIAL ECLIPSE



Note - The hours of beginning and end

USE OF JUNE 7<sup>TH</sup> 1899.



*ending are expressed in Greenwich Mean Time.*





**BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE  
OF THE SUN, 1899, JUNE 7.**

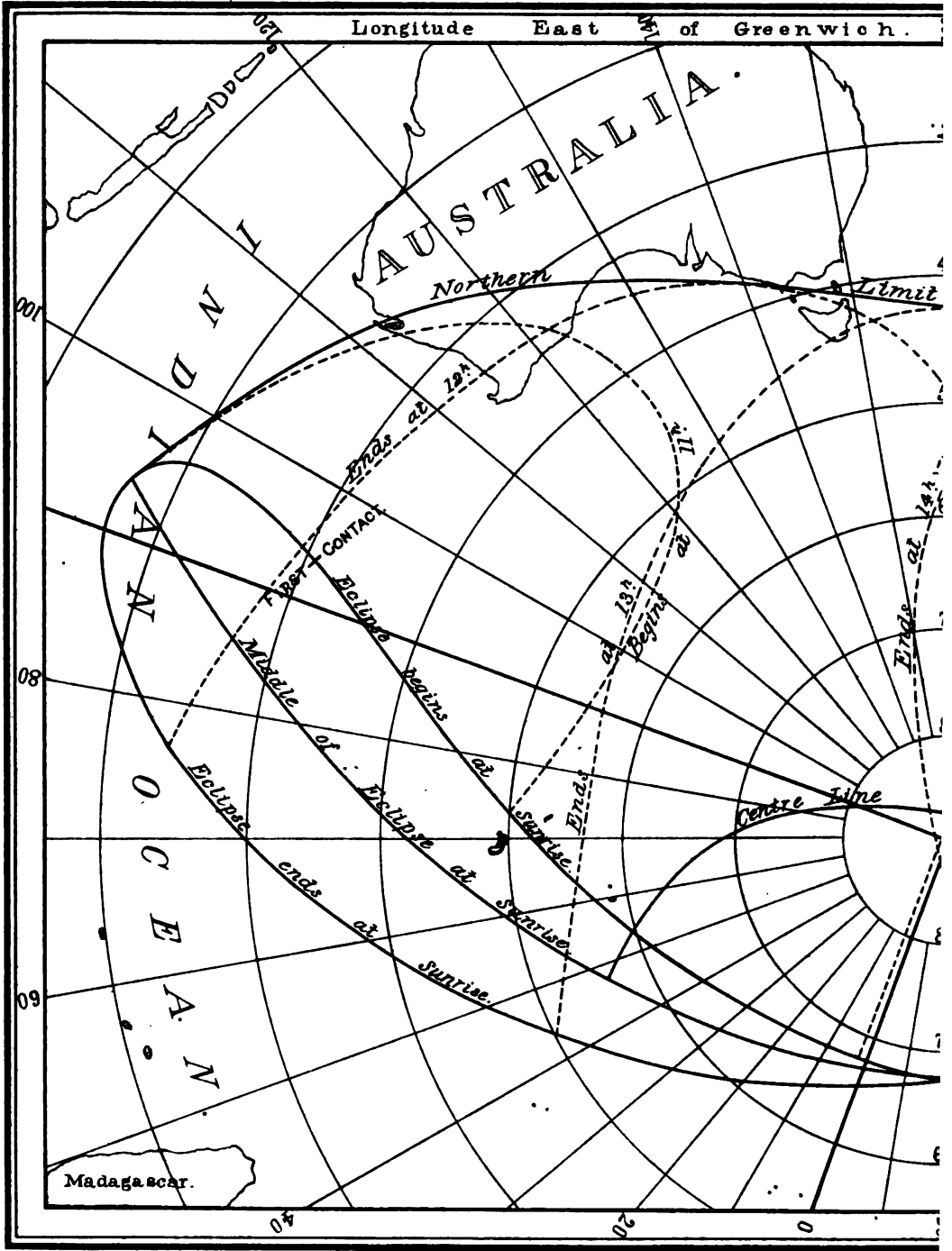
Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	$x$	$y$	Log sin $d$	Log cos $d$	$\mu$	
16 <sup>h</sup> <sup>m</sup> 40 50	-0.98932 0.90232	+1.20875 1.20880	+9.58878 9.58879	+9.96457 9.96457	250° 19.1 252 49.1	+0.55780 0.55782
17 0 10 20 30 40 50	-0.81532 0.72832 0.64132 0.55431 0.46731 0.38030	+1.20884 1.20886 1.20887 1.20886 1.20884 1.20881	+9.58881 9.58882 9.58883 9.58884 9.58885 9.58886	+9.96457 9.96457 9.96457 9.96456 9.96456 9.96456	255 19.1 257 49.1 260 19.1 262 49.0 265 19.0 267 49.0	+0.55784 0.55786 0.55788 0.55790 0.55792 0.55794
18 0 10 20 30 40 50	-0.29330 0.20630 0.11930 -0.03230 +0.05470 0.14170	+1.20877 1.20872 1.20865 1.20857 1.20848 1.20838	+9.58888 9.58889 9.58890 9.58891 9.58892 9.58893	+9.96456 9.96456 9.96456 9.96455 9.96455 9.96455	270 19.0 272 49.0 275 19.0 277 49.0 280 19.0 282 49.0	+0.55796 0.55798 0.55800 0.55802 0.55804 0.55806
19 0 10 20 30 40 50	+0.22869 0.31569 0.40269 0.48968 0.57668 0.66367	+1.20827 1.20815 1.20802 1.20788 1.20773 1.20757	+9.58895 9.58896 9.58897 9.58898 9.58899 9.58900	+9.96455 9.96455 9.96455 9.96454 9.96454 9.96454	285 19.0 287 49.0 290 19.0 292 49.0 295 19.0 297 49.0	+0.55807 0.55809 0.55810 0.55811 0.55812 0.55813
20 0 10 20 30	+0.75067 0.83766 0.92465 +1.01164	+1.20739 1.20720 1.20700 +1.20679	+9.58902 9.58903 9.58904 9.58905	+9.96454 9.96454 9.96454 +9.96453	300 19.0 302 48.9 305 18.9 307 48.9	+0.55814 0.55815 0.55816 +0.55817
Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.		Log $\Delta y$ for 1 Minute.		Log $\Delta \mu$ for 1 Minute.	Log Tangent of Angle of Cone—
						Penumbra.
16 0	+7.9395		+4.9685		+1.1761	+7.66338
17 0	7.9395		+4.3490		1.1761	7.66338
18 0	7.9395		-4.6812		1.1761	7.66338
19 0	7.9395		5.0638		1.1761	7.66338
20 0	7.9395		5.2537		1.1761	7.66337
21 0	+7.9394		-5.3909		+1.1761	+7.66337

BESSELIAN ELEMENTS OF THE ANNULAR ECLIPSE  
OF THE SUN, 1899, DECEMBER 2.

Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow on Fundamental Plane.	
	$x$	$y$	Log sin $d$	Log cos $d$	$\mu$	$l$	$l'$
h m							
10 30	-1.38903	-0.84502	-9.57436	+9.96704	160 4.0	+0.55277	+0.00682
40	1.29756	0.84919	9.57438	9.96704	162 33.9	0.55276	0.00681
50	1.20608	0.85335	9.57440	9.96703	165 3.9	0.55275	0.00680
11 0	-1.11460	-0.85750	-9.57442	+9.96703	167 33.9	+0.55274	+0.00679
10	1.02312	0.86163	9.57443	9.96703	170 3.9	0.55272	0.00678
20	0.93163	0.86575	9.57445	9.96702	172 33.8	0.55271	0.00677
30	0.84014	0.86986	9.57447	9.96702	175 3.8	0.55269	0.00676
40	0.74865	0.87397	9.57449	9.96702	177 33.8	0.55268	0.00674
50	0.65716	0.87807	9.57451	9.96701	180 3.8	0.55266	0.00673
12 0	-0.56566	-0.88216	-9.57453	+9.96701	182 33.7	+0.55265	+0.00671
10	0.47416	0.88623	9.57454	9.96701	185 3.7	0.55263	0.00670
20	0.38266	0.89029	9.57456	9.96700	187 33.7	0.55262	0.00668
30	0.29115	0.89434	9.57458	9.96700	190 3.7	0.55260	0.00666
40	0.19964	0.89838	9.57460	9.96700	192 33.6	0.55258	0.00664
50	0.10813	0.90240	9.57462	9.96699	195 3.6	0.55256	0.00662
13 0	-0.01662	-0.90641	-9.57464	+9.96699	197 33.6	+0.55254	+0.00660
10	+0.07490	0.91041	9.57465	9.96699	200 3.6	0.55252	0.00658
20	0.16642	0.91440	9.57467	9.96698	202 33.5	0.55250	0.00656
30	0.25794	0.91838	9.57469	9.96698	205 3.5	0.55248	0.00654
40	0.34946	0.92235	9.57471	9.96698	207 33.5	0.55246	0.00652
50	0.44098	0.92630	9.57473	9.96697	210 3.4	0.55244	0.00649
14 0	+0.53250	-0.93024	-9.57475	+9.96697	212 33.4	+0.55241	+0.00647
10	0.62402	0.93417	9.57476	9.96697	215 3.4	0.55239	0.00645
20	0.71554	0.93809	9.57478	9.96696	217 33.4	0.55236	0.00642
30	0.80706	0.94200	9.57480	9.96696	220 3.3	0.55234	0.00640
40	0.89858	0.94590	9.57482	9.96696	222 33.3	0.55231	0.00637
50	0.99011	0.94979	9.57484	9.96695	225 3.3	0.55229	0.00635
15 0	+1.08164	-0.95367	-9.57486	+9.96695	227 33.3	+0.55226	+0.00632
10	1.17317	0.95754	9.57487	0.96695	230 3.2	0.55223	0.00629
20	+1.26470	-0.96140	-9.57489	+9.96694	232 33.2	+0.55220	+0.00626
Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.		Log $\Delta y$ for 1 Minute.		Log $\Delta \mu$ for 1 Minute.	Log Tangents of Angles of Cones—	
						Penumbra.	Shadow.
h m							
10 0	+7.9612		-6.6238		+1.1760	+7.67628	+7.67411
11 0	7.9613		6.6173		1.1760	7.67628	7.67411
12 0	7.9614		6.6103		1.1760	7.67628	7.67412
13 0	7.9615		6.6029		1.1760	7.67629	7.67412
14 0	7.9615		6.5953		1.1760	7.67629	7.67412
15 0	+7.9615		-6.5877		+1.1760	+7.67629	+7.67412

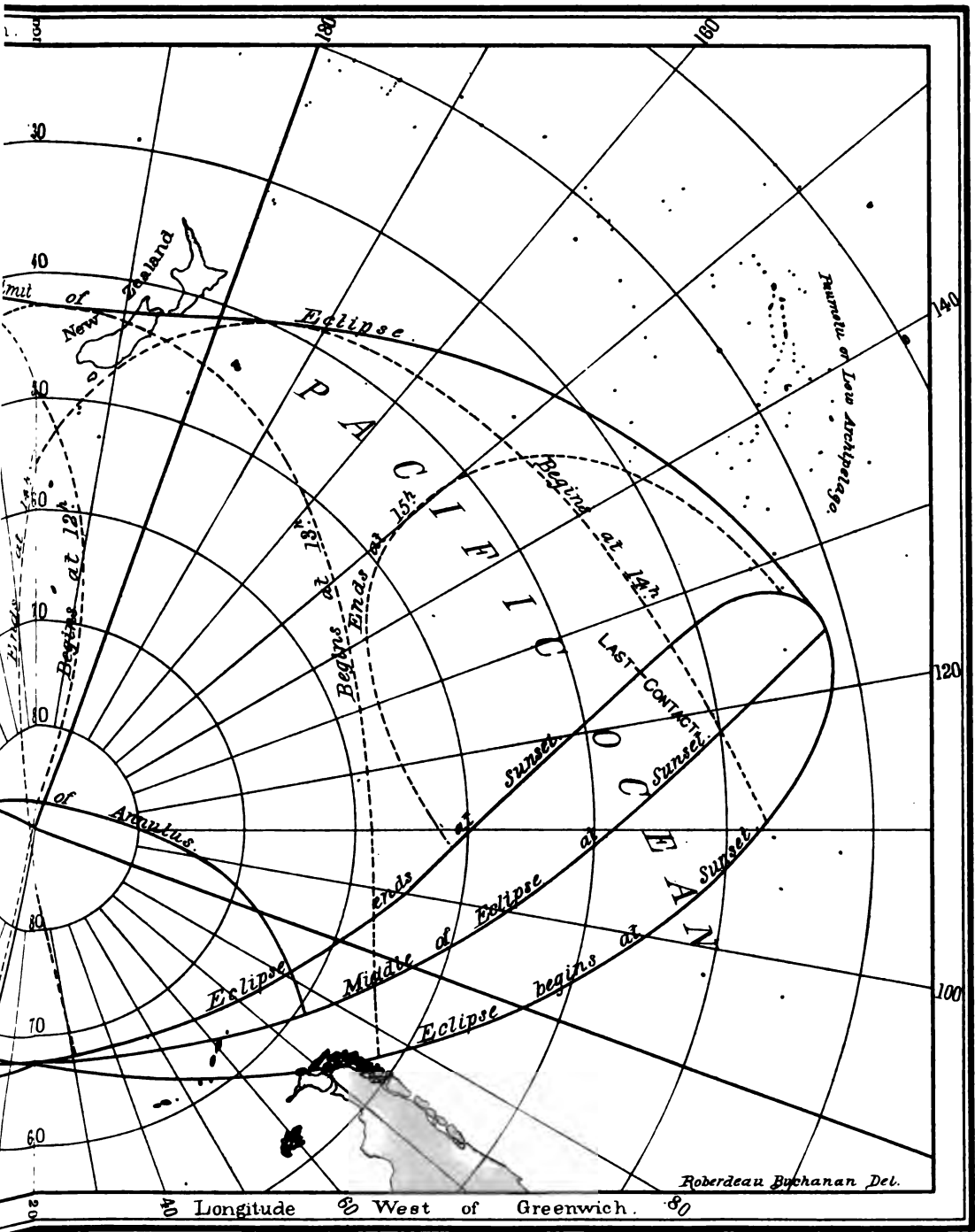


# ANNULAR ECLIPSE c



**Note-** The hours of beginning and

E OF DECEMBER 2<sup>ND</sup> 1899.



and ending are expressed in Greenwich Mean Time.



## WASHINGTON MEAN TIME.

## PHASES OF THE MOON.

New Moon.				First Quarter.				Full Moon.				Last Quarter.			
	d	h	m		d	h	m		d	h	m		d	h	m
January	11	5	41.3	January	17	23	27.9	January	26	2	25.8	January	4	10	13.2
February	9	16	23.4	February	16	15	43.7	February	24	21	7.5	February	3	0	16.1
March	11	2	44.5	March	18	10	15.5	March	26	13	10.2	March	4	10	58.3
April	9	13	12.5	April	17	5	34.7	April	25	2	13.5	April	2	18	47.4
May	9	0	30.4	May	17	0	4.5	May	24	12	40.6	May	2	0	38.4
June	7	13	12.1	June	15	16	38.2	June	22	21	11.8	May	31	5	46.3
July	7	3	23.1	July	15	6	50.6	July	22	4	33.1	June	29	11	36.6
August	5	18	39.6	August	13	18	45.8	August	20	11	36.7	July	28	19	34.1
September	4	10	24.7	September	12	4	40.9	September	18	19	23.0	August	27	6	48.6
October	4	2	5.7	October	11	13	1.3	October	18	4	56.4	September	25	21	54.3
November	2	17	18.3	November	9	20	26.6	November	16	17	10.3	October	25	16	31.8
December	2	7	39.4	December	9	3	54.3	December	16	8	22.8	November	24	13	26.3
												December	24	10	49.0

## APOGEE, PERIGEE, AND GREATEST LIBRATION.

Perigee.			Apogee.			Greatest Libration.							
	d	h		d	h		d	h	m		d	h	m
January	11	8.5	January	25	1.1	January	5	8	39 E.	January	17	9	52 W.
February	8	21.2	February	21	8.7	February	2	14	12 E.	February	14	17	53 W.
March	9	4.7	March	21	1.5	March	2	6	52 E.	March	14	22	53 W.
April	5	20.0	April	17	21.0	March	28	17	58 E.	April	11	18	57 W.
May	1	3.9	May	15	16.2	April	24	6	48 E.	May	8	22	25 W.
May	27	13.9	June	12	9.8	May	21	17	25 E.	June	4	5	43 W.
June	24	11.6	July	9	23.2	June	18	15	48 E.	July	1	4	31 W.
July	22	18.6	August	6	5.2	July	16	19	38 E.	July	29	0	44 W.
August	20	4.5	September	2	8.4	August	14	0	41 E.	August	26	4	41 W.
September	17	13.7	September	29	19.0	September	11	1	27 E.	September	23	9	52 W.
October	15	17.0	October	27	12.3	October	8	9	4 E.	October	21	11	32 W.
November	11	19.1	November	24	8.7	November	3	13	28 E.	November	18	3	15 W.
December	6	13.1	December	22	5.7	November	30	11	46 E.	December	14	20	38 W.
						December	28	6	36 E.				

## FORMULÆ FOR THE LIBRATION OF THE MOON.

Put  $I$ , the inclination of the moon's equator to the ecliptic ( $= 1^\circ 28'.8$ ),

$\Omega$ , the mean longitude of the moon's ascending node, (see page 278), or the mean longitude of the descending node of the moon's equator,

$C$ , the angle at the centre of the moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,

$\lambda, \beta, \alpha', \delta'$  the apparent longitude, latitude, right ascension, and declination of the moon, corrected for parallax,

$\lambda'$ , the selenocentric longitude of the earth, counted on the moon's equator from its descending node,  $\Omega$ ,

$i, \Delta, \Omega', C$ , the quantities defined on page 276, where their values for the year are given.

The moon's libration in longitude and latitude may then be found, for any time, by means of the following formulæ, in connection with the tables given on pages 276 and 277:—

$$\left. \begin{aligned} \Delta \lambda &= -0'.57 \sin 2(\Omega - \lambda) \\ a &= \sin I \cos(\Omega - \lambda) \\ \tan B &= \tan I \sin(\Omega - \lambda) \\ \lambda' &= \lambda + \Delta \lambda + a \delta \end{aligned} \right\} \text{See table, page 277.}$$

$$\begin{aligned} \text{The libration in latitude} &= \delta = B - \beta \\ \text{The libration in longitude} &= l = \lambda' - C \\ \sin C &= \sin i \frac{\cos(\lambda' + \Delta - \Omega)}{\cos \delta'} = \pm \sin i \frac{\cos(\alpha' - \Omega')}{\cos \delta} \end{aligned}$$



MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.
		h	m	s		°	'	"	
36 Piscium . . . . .	6.3	0	11	22.626	-0.0025	+ 7	40	45.78	-0.009
38 Piscium . . . . .	6.9	0	12	12.242	+0.0032	8	18	47.17	+0.094
<i>d</i> Piscium . . . . .	5.3	0	15	23.997	-0.0001	7	37	45.41	+0.011
45 Piscium . . . . .	6.9	0	20	29.439	+0.0015	7	7	58.09	-0.053
58 Piscium . . . . .	5.0	0	41	45.250	+0.0025	11	25	23.89	-0.015
75 Piscium . . . . .	6.0	1	1	14.800	+0.0014	+12	24	52.78	+0.031
101 Piscium . . . . .	6.3	1	30	22.314	-0.0005	14	8	42.30	-0.015
103 Piscium . . . . .	6.8	1	33	48.531	-0.0014	16	6	46.84	-0.026
104 Piscium . . . . .	7.5	1	33	50.740	+0.0066	13	46	22.60	-0.036
105 Piscium . . . . .	6.3	1	34	13.763	+0.0040	15	53	36.47	-0.011
3 Arietis . . . . .	6.0	1	41	6.144	+0.0014	+16	54	23.58	-0.014
4 Arietis . . . . .	5.7	1	42	42.118	+0.0024	16	27	10.33	-0.021
<i>t</i> Arietis . . . . .	5.7	1	51	49.890	+0.0020	17	19	27.47	-0.032
B. A. C. 686 . . . . .	7.2	2	8	15.432	+0.0011	19	8	28.75	0.000
θ Arietis . . . . .	5.7	2	12	30.358	-0.0012	19	26	1.91	-0.008
23 Arietis . . . . .	7.5	2	13	31.713	-0.0018	+19	13	31.97	-0.116
26 Arietis . . . . .	6.0	2	24	58.446	+0.0047	19	24	25.16	-0.032
27 Arietis . . . . .	6.3	2	25	18.212	+0.0026	17	15	25.50	-0.066
B. A. C. 782 . . . . .	7.0	2	27	57.550	+0.0050	18	26	4.79	+0.008
μ Arietis . . . . .	6.0	2	36	40.210	+0.0018	19	34	51.63	-0.055
47 Arietis . . . . .	6.0	2	52	18.255	+0.0152	+20	15	49.40	-0.029
B. A. C. 920 . . . . .	7.0	2	53	5.57	+0.0026	21	12	57.6	0.000
δ Arietis . . . . .	4.0	3	5	51.115	+0.0099	19	20	41.32	-0.003
ζ Arietis . . . . .	4.8	3	9	5.676	-0.0022	20	40	12.45	-0.084
τ <sub>1</sub> Arietis . . . . .	5.0	3	15	23.716	+0.0028	20	46	58.42	-0.044
τ <sub>2</sub> Arietis . . . . .	5.3	3	16	56.406	-0.0036	+20	22	50.82	-0.017
65 Arietis . . . . .	6.0	3	18	36.624	-0.0002	20	26	42.25	-0.006
B. A. C. 1055 . . . . .	6.8	3	18	42.263	+0.0048	21	41	3.5	0.000
66 Arietis . . . . .	6.0	3	22	32.217	-0.0002	22	27	20.98	-0.124
9 Tauri . . . . .	7.0	3	31	1.588	-0.0011	22	52	35.92	-0.053
B. A. C. 1143 . . . . .	6.0	3	38	35.448	-0.0018	+20	36	36.12	-0.001
g Pleiadum . . . . .	6.3	3	38	47.882	+0.0009	23	58	17.87	-0.059
17 Tauri . . . . .	4.3	3	38	52.570	+0.0008	23	47	44.33	-0.059
19 Tauri . . . . .	5.0	3	39	11.650	+0.0009	24	9	0.77	-0.059
20 Tauri . . . . .	5.0	3	39	48.888	+0.0009	24	3	7.23	-0.059
21 Tauri . . . . .	7.0	3	39	53.357	+0.0009	+24	14	20.27	-0.059
22 Tauri . . . . .	7.0	3	40	1.894	+0.0009	24	12	44.48	-0.059
23 Tauri . . . . .	4.7	3	40	19.785	+0.0009	23	38	1.03	-0.059
B. A. C. 1170 . . . . .	6.3	3	42	21.969	+0.0000	23	6	39.05	-0.048
26 Tauri . . . . .	7.0	3	42	56.779	+0.0009	23	32	50.69	-0.059
27 Tauri . . . . .	4.0	3	43	9.282	+0.0009	+23	44	40.26	-0.059
28 Tauri . . . . .	6.2	3	43	10.544	+0.0009	23	49	40.41	-0.059
B. A. C. 1189 . . . . .	6.0	3	43	58.6	0.0000	21	56	16.9	0.000
32 Tauri . . . . .	6.0	3	50	53.863	+0.0030	22	11	13.50	-0.111
33 Tauri . . . . .	6.3	3	51	4.596	+0.0044	22	52	55.68	-0.020
B. A. C. 1238 . . . . .	6.3	3	54	56.802	-0.0003	+22	55	1.23	-0.025
36 Tauri . . . . .	6.0	3	58	19.183	0.0000	23	49	39.87	-0.024
A <sup>3</sup> Tauri . . . . .	6.3	3	59	21.458	+0.0126	21	44	11.46	-0.128
56 Tauri . . . . .	6.0	4	13	37.847	+0.0016	21	31	45.55	-0.052
B. A. C. 1347 . . . . .	7.3	4	17	24.001	+0.0053	24	10	15.0	....
62 Tauri . . . . .	6.0	4	17	54.366	+0.0010	+24	3	55.84	-0.028
χ <sup>1</sup> Tauri . . . . .	4.7	4	19	20.873	+0.0064	22	3	45.87	-0.052
χ <sup>2</sup> Tauri . . . . .	6.3	4	19	24.022	+0.0087	21	58	8.02	-0.056
υ <sup>1</sup> Tauri . . . . .	4.7	4	20	15.908	+0.0109	+22	35	4.23	-0.045

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
♊ Tauri . . . . .	6.0	4 21 14.973	-0.0003	+22 46 7.03	-0.016
95 Tauri . . . . .	6.3	4 37 6.827	+0.0007	23 53 50.73	-0.026
B. A. C. 1463 . . . . .	6.3	4 39 36.518	-0.0004	23 26 33.3	....
99 Tauri . . . . .	6.0	4 51 40.899	-0.0005	23 47 26.26	-0.026
♋ Tauri . . . . .	6.0	4 51 58.541	+0.0027	24 53 39.22	-0.062
103 Tauri . . . . .	6.0	5 1 57.292	-0.0006	+24 7 53.79	-0.011
♌ Tauri . . . . .	5.7	5 13 12.497	+0.0016	21 59 31.29	-0.083
118 Tauri . . . . .	5.7	5 23 3.547	+0.0011	25 4 7.18	-0.030
121 Tauri . . . . .	6.0	5 29 17.004	+0.0002	23 58 19.93	-0.031
125 Tauri . . . . .	6.0	5 33 28.568	+0.0004	25 50 25.53	-0.031
B. A. C. 1801 . . . . .	6.0	5 37 11.5	.....	+23 9 25.5	....
132 Tauri . . . . .	5.3	5 42 49.025	-0.0006	24 32 1.10	-0.021
140 Tauri . . . . .	7.0	5 54 20.782	-0.0010	22 53 38.60	-0.006
141 Tauri . . . . .	6.7	5 55 35.615	-0.0020	22 23 52.23	-0.026
1 Geminorum . . . . .	5.0	5 57 58.851	-0.0000	23 16 7.75	-0.102
2 Geminorum . . . . .	7.2	5 59 39.253	+0.0004	+23 38 51.74	-0.015
3 Geminorum . . . . .	6.3	6 3 35.926	-0.0001	23 7 46.94	-0.014
4 Geminorum . . . . .	7.4	6 4 22.404	-0.0005	23 0 50.58	-0.064
5 Geminorum . . . . .	6.7	6 5 20.645	-0.0004	24 26 31.85	-0.064
6 Geminorum . . . . .	6.7	6 6 11.732	-0.0004	22 55 53.39	0.000
8 Geminorum . . . . .	6.5	6 10 8.815	-0.0021	+24 0 7.96	-0.039
9 Geminorum . . . . .	6.3	6 10 49.000	-0.0007	23 46 29.05	-0.011
10 Geminorum . . . . .	7.0	6 12 45.080	-0.0018	23 38 25.44	-0.063
11 Geminorum . . . . .	7.3	6 13 10.494	+0.0009	23 30 33.65	+0.006
12 Geminorum . . . . .	7.5	6 13 14.4	.....	23 18 56.8	....
14 Geminorum . . . . .	7.2	6 19 39.017	-0.0019	+21 42 2.66	-0.027
♊ Geminorum . . . . .	6.0	6 45 29.914	-0.0007	21 52 48.25	-0.049
44 Geminorum . . . . .	6.0	6 59 13.624	-0.0004	22 47 19.14	-0.016
56 Geminorum . . . . .	5.7	7 15 59.319	-0.0048	20 38 3.46	-0.021
61 Geminorum . . . . .	6.0	7 20 59.176	-0.0013	20 27 32.98	-0.025
63 Geminorum . . . . .	5.7	7 21 44.733	-0.0038	+21 39 6.17	-0.120
♌ Geminorum . . . . .	6.0	7 33 38.607	-0.0011	17 54 16.53	+0.006
79 Geminorum . . . . .	6.3	7 39 13.493	-0.0040	20 33 31.98	+0.010
♍ Geminorum . . . . .	5.3	7 40 16.638	-0.0055	18 45 23.24	-0.058
85 Geminorum . . . . .	6.0	7 49 46.260	-0.0021	20 9 2.81	-0.034
B. A. C. 2658 . . . . .	7.2	7 54 51.877	0.0000	+18 31 21.08	+0.003
3 Cancri . . . . .	6.0	7 55 0.090	-0.0014	17 35 7.00	-0.023
5 Cancri . . . . .	6.3	7 55 45.007	+0.0010	16 44 0.95	-0.016
♋ Cancri . . . . .	6.0	8 17 34.874	-0.0048	18 39 23.48	-0.253
B. A. C. 2810 . . . . .	7.0	8 19 0.509	-0.0006	17 30 42.82	-0.122
♌ Cancri . . . . .	6.0	8 20 6.883	-0.0140	+17 22 44.85	-0.147
29 Cancri . . . . .	6.0	8 22 59.188	-0.0021	14 32 42.26	-0.025
54 Cancri . . . . .	6.3	8 45 23.965	-0.0090	15 43 29.84	+0.061
♌ Cancri . . . . .	5.7	8 51 37.035	+0.0042	15 42 36.49	+0.018
♌ Cancri . . . . .	4.0	8 52 57.846	+0.0019	12 14 55.07	-0.041
♌ Leonis . . . . .	5.9	9 23 2.972	+0.0035	+ 9 29 47.85	-0.006
♌ Leonis . . . . .	5.3	9 26 30.132	-0.0073	11 44 49.47	-0.082
♌ Leonis . . . . .	5.7	9 26 32.844	+0.0006	10 9 40.18	-0.012
10 Sextantis . . . . .	6.0	9 51 4.743	-0.0070	9 24 41.66	+0.010
11 Sextantis . . . . .	6.0	9 52 46.612	+0.0003	8 47 45.87	-0.032
14 Sextantis . . . . .	6.6	10 1 30.542	-0.0036	+ 6 6 14.67	-0.005
16 Sextantis . . . . .	6.9	10 3 57.410	+0.0006	6 39 57.13	-0.013
19 Sextantis . . . . .	6.2	10 7 33.030	-0.0050	5 6 49.61	-0.001
43 Leonis . . . . .	6.5	10 17 43.396	-0.0020	+ 7 3 18.73	-0.111

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.
		h	m	s		°	'	"	
34 Sextantis . . .	6.7	10	37	24.554	-0.0069	+	4	6 38.35	+0.016
36 Sextantis . . .	6.6	10	39	57.219	-0.0041		3	1 9.10	-0.016
55 Leonis . . .	6.2	10	50	30.643	+0.0065		1	16 30.89	-0.014
57 Leonis . . .	6.9	10	50	59.784	+0.0011		0	58 17.64	-0.022
$\rho^a$ Leonis . . .	5.4	10	58	26.333	-0.0039	+	0	32 34.17	-0.013
$\rho^b$ Leonis . . .	6.9	11	4	4.374	-0.0013	-	0	47 9.06	-0.003
$\rho^c$ Leonis . . .	5.7	11	8	35.409	-0.0026	+	0	28 47.48	-0.012
$\epsilon$ Leonis . . .	5.3	11	25	9.241	+0.0009	-	2	26 46.47	-0.013
B. A. C. 4006 . . .	6.1	11	45	52.575	+0.0029		4	46 19.02	-0.022
14 Virginis . . .	6.9	12	14	8.346	+0.0022		8	21 12.66	-0.043
$\eta$ Virginis . . .	5.7	12	28	33.879	-0.0070	-	8	53 42.69	-0.014
$\zeta$ Virginis . . .	5.7	13	21	22.934	-0.0099		12	10 56.83	-0.041
75 Virginis . . .	6.0	13	27	27.891	-0.0029		14	50 36.94	-0.012
83 Virginis . . .	6.0	13	39	2.825	+0.0006		15	40 17.48	-0.031
85 Virginis . . .	6.5	13	40	8.616	-0.0051		15	15 36.39	-0.043
B. A. C. 4700 . . .	5.6	14	5	19.541	+0.0028	-	15	49 29.59	-0.009
B. A. C. 4722 . . .	5.8	14	9	50.092	-0.0027		17	43 46.65	-0.015
B. A. C. 4923 . . .	7.3	14	51	33.6	+0.0691		20	57 28.97	-1.646
$\iota^1$ Libræ . . .	5.0	15	6	27.733	-0.0041		19	24 34.44	-0.050
$\iota^2$ Libræ . . .	6.5	15	7	33.893	-0.0043		19	16 1.24	-0.034
42 Libræ . . .	5.7	15	34	18.549	-0.0022	-	23	29 23.46	-0.033
B. A. C. 5253 . . .	5.8	15	47	51.814	-0.0023		24	13 55.46	-0.030
B. A. C. 5254 . . .	5.8	15	47	55.069	-0.0031		23	40 37.25	-0.017
19 Scorpii . . .	5.1	16	14	33.403	-0.0023		23	55 35.43	-0.064
$\sigma$ Scorpii . . .	3.4	16	15	2.837	-0.0022		25	21 1.46	-0.026
$\rho$ Ophiuchi (south star) .	5.0	16	19	31.634	-0.0017	-	23	12 52.40	-0.042
22 Scorpii . . .	5.5	16	24	4.206	-0.0011		24	53 35.08	-0.038
15 Ophiuchi . . .	7.3	16	39	3.918	-0.0048		22	59 44.46	-0.005
25 Scorpii . . .	7.0	16	40	40.314	-0.0004		25	20 39.84	-0.004
18 Ophiuchi . . .	6.7	16	43	35.468	-0.0027		24	27 49.37	-0.044
22 Ophiuchi . . .	6.7	16	48	44.556	-0.0010	-	23	20 48.13	-0.052
24 Ophiuchi . . .	5.9	16	50	42.489	-0.0001		22	59 22.87	-0.006
B. A. C. 5709 . . .	6.3	16	53	46.680	+0.0007		24	56 18.02	+0.011
26 Ophiuchi . . .	6.1	16	53	58.178	+0.0015		24	50 6.32	-0.007
31 Ophiuchi . . .	6.7	16	58	30.714	+0.0001		25	30 2.92	-0.008
B. A. C. 5815 . . .	7.3	17	10	14.461	-0.0080	-	25	11 25.50	....
39 Ophiuchi (south star) .	5.5	17	11	51.001	-0.0060		24	10 37.83	-0.035
B. A. C. 5831 . . .	6.9	17	11	56.978	+0.0073		23	57 42.23	-0.104
B. A. C. 5846 . . .	6.8	17	15	29.776	-0.0053		24	48 14.60	-0.040
B. A. C. 5868 . . .	7.0	17	18	55.812	+0.0008		24	9 4.63	-0.007
$\alpha^2$ Ophiuchi . . .	5.2	17	25	15.149	-0.0011	-	23	53 4.52	-0.036
52 Ophiuchi . . .	6.5	17	29	13.876	-0.0022		21	58 33.98	-0.050
63 Ophiuchi . . .	6.6	17	48	41.124	-0.0004		24	52 0.23	+0.002
B. A. C. 6066 . . .	7.3	17	50	57.142	-0.0001		23	55 29.37	-0.022
4 Sagittarii . . .	5.4	17	53	37.586	-0.0006		23	48 24.85	-0.066
5 Sagittarii . . .	7.0	17	54	0.095	+0.0031	-	24	16 33.45	-0.035
7 Sagittarii . . .	5.9	17	56	39.719	-0.0018		24	16 52.71	-0.013
Piazzi 17 <sup>h</sup> 330 . . .	5.3	17	57	29.6	.....		23	8 25.4	....
9 Sagittarii . . .	6.0	17	57	40.800	-0.0020		24	21 46.51	-0.026
Piazzi 17 <sup>h</sup> 334 . . .	5.3	17	57	48.480	-0.0023		22	50 22.53	0.000
B. A. C. 6161 . . .	5.7	18	5	33.534	+0.0003	-	23	43 20.54	-0.070
14 Sagittarii . . .	6.0	18	8	11.621	-0.0038		21	44 23.93	-0.034
B. A. C. 6304 . . .	7.0	18	27	3.890	-0.0014		24	10 59.72	-0.021
24 Sagittarii . . .	5.9	18	27	43.283	-0.0012	-	24	6 26.25	-0.009

## STARS OCCULTED BY THE MOON.

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MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
25 Sagittarii . . .	6.3	18 28 22.340	+0.0049	-24 17 56.26	+0.009
B. A. C. 6336 . . .	6.2	18 31 51.572	-0.0029	21 28 53.83	-0.107
B. A. C. 6343 . . .	6.3	18 32 22.128	-0.0014	23 35 28.12	-0.033
B. A. C. 6347 . . .	6.0	18 32 52.043	-0.0063	21 8 7.58	-0.156
26 Sagittarii . . .	6.6	18 35 41.990	+0.0012	23 55 38.89	-0.030
28 Sagittarii . . .	5.6	18 40 15.117	+0.0006	-22 29 53.74	-0.022
B. A. C. 6386 . . .	7.3	18 41 52.830	-0.0008	20 23 3.14	-0.034
29 Sagittarii . . .	5.5	18 43 40.515	-0.0008	20 26 22.67	+0.014
30 Sagittarii . . .	6.6	18 44 46.160	-0.0050	22 16 40.57	-0.038
31 Sagittarii . . .	7.0	18 46 4.322	-0.0003	22 2 23.87	-0.044
33 Sagittarii . . .	6.0	18 47 57.932	-0.0005	-21 28 59.59	-0.006
ν <sup>1</sup> Sagittarii . . .	5.0	18 48 4.242	-0.0019	22 52 9.19	-0.031
ν <sup>2</sup> Sagittarii . . .	5.1	18 49 0.787	+0.0062	22 47 50.58	-0.025
B. A. C. 6448 . . .	6.4	18 49 53.787	-0.0003	23 18 7.87	-0.018
ξ <sup>1</sup> Sagittarii . . .	5.7	18 51 20.341	-0.0020	20 47 18.97	-0.029
ξ <sup>2</sup> Sagittarii . . .	3.5	18 51 42.296	+0.0019	-21 14 21.65	-0.022
ο Sagittarii . . .	3.8	18 58 37.856	+0.0041	21 53 22.17	-0.073
π Sagittarii . . .	3.1	19 3 45.468	-0.0014	21 11 3.14	-0.044
B. A. C. 6607 . . .	5.9	19 14 35.080	-0.0009	22 35 27.00	-0.020
50 Sagittarii . . .	5.9	19 20 17.707	+0.0004	21 58 35.96	-0.009
B. A. C. 6658 . . .	7.3	19 22 12.7	.....	-18 33 47.11	+0.025
B. A. C. 6707 . . .	6.4	19 30 32.901	+0.0016	19 4 32.13	-0.003
B. A. C. 6710 . . .	5.8	19 31 11.843	+0.0022	18 27 21.79	-0.056
f Sagittarii . . .	5.2	19 40 28.240	-0.0106	20 0 14.36	-0.096
57 Sagittarii . . .	6.1	19 46 19.947	+0.0004	19 18 5.68	-0.066
B. A. C. 6992 . . .	6.7	20 15 6.092	+0.0012	-15 6 12.19	-0.004
β Capricorni . . .	3.2	20 15 20.232	+0.0019	15 6 1.46	-0.003
ρ Capricorni . . .	5.3	20 23 6.040	-0.0013	18 8 51.24	-0.020
B. A. C. 7087 . . .	6.3	20 28 33.984	-0.0002	14 4 5.35	+0.052
τ <sub>1</sub> Capricorni . . .	7.0	20 31 41.514	+0.0052	15 29 49.89	-0.040
τ <sub>2</sub> Capricorni . . .	5.6	20 33 37.556	+0.0001	-15 18 33.01	-0.029
8 Aquarii . . .	6.8	20 54 21.830	-0.0030	13 26 41.14	-0.012
9 Aquarii . . .	6.8	20 55 34.375	-0.0017	13 55 31.01	-0.013
ν Aquarii . . .	4.7	21 4 5.580	+0.0055	11 46 50.39	-0.016
18 Aquarii . . .	5.7	21 18 40.467	+0.0061	13 18 42.26	-0.008
19 Aquarii . . .	5.8	21 19 47.354	-0.0008	-10 10 42.70	-0.170
B. A. C. 7562 . . .	5.5	21 39 32.168	+0.0047	9 30 3.45	0.000
ε <sup>1</sup> Capricorni . . .	5.5	21 39 37.141	-0.0005	9 32 46.96	-0.005
ε <sup>2</sup> Capricorni . . .	6.4	21 40 52.943	-0.0008	9 44 32.17	-0.007
30 Aquarii . . .	5.8	21 57 57.688	+0.0015	7 0 38.09	+0.001
B. A. C. 7704 . . .	7.3	22 2 23.994	-0.0022	-6 19 20.2	....
36 Aquarii . . .	6.3	22 4 6.414	+0.0021	8 40 56.22	+0.045
B. A. C. 7717 . . .	6.9	22 4 10.152	+0.0073	8 1 23.0	....
B. A. C. 7744 . . .	6.7	22 7 28.343	-0.0038	5 13 7.09	-0.026
B. A. C. 7752 . . .	6.7	22 8 36.290	+0.0072	4 57 7.0	....
44 Aquarii . . .	6.4	22 11 50.106	-0.0014	-5 53 29.12	+0.031
51 Aquarii . . .	5.8	22 18 51.246	+0.0012	5 20 53.83	-0.002
κ Aquarii . . .	5.2	22 32 31.608	-0.0051	4 44 56.52	-0.122
Lalande 44337 . . .	6.3	22 35 34.0	.....	4 4 42.0	....
3 Piscium . . .	6.4	22 55 26.907	-0.0031	-0 21 22.11	+0.021
W <sup>2</sup> 22 <sup>b</sup> 1220 . . .	6.6	23 0 7.6	.....	+0 45 47.2	....
κ Piscium . . .	4.7	23 21 45.268	+0.0046	0 42 8.69	-0.111
9 Piscium . . .	6.6	23 22 4.410	+0.0032	0 34 2.46	-0.051
16 Piscium . . .	5.8	23 31 14.037	-0.0080	1 32 30.09	+0.056
19 Piscium . . .	4.9	23 41 13.806	-0.0039	+2 55 34.97	-0.032

MEAN PLACES FOR 1899.0. (January 0 <sup>d</sup> .0—0 <sup>d</sup> .140, Washington.)						
Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.	
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	
34 Sextantis . . . . .	6.7	10 37 24.554	-0.0069	+ 4 6 38.35	+0.016	
36 Sextantis . . . . .	6.6	10 39 57.219	-0.0041	3 1 9.10	-0.016	
55 Leonis . . . . .	6.2	10 50 30.643	+0.0065	1 16 30.89	-0.014	
57 Leonis . . . . .	6.9	10 50 59.784	+0.0011	0 58 17.64	-0.022	
$\rho^3$ Leonis . . . . .	5.4	10 58 26.333	-0.0039	+ 0 32 34.17	-0.013	
$\rho^4$ Leonis . . . . .	6.9	11 4 4.374	-0.0013	- 0 47 9.06	-0.003	
$\rho^5$ Leonis . . . . .	5.7	11 8 35.409	-0.0026	+ 0 28 47.48	-0.012	
$\epsilon$ Leonis . . . . .	5.3	11 25 9.241	+0.0009	- 2 26 46.47	-0.013	
B. A. C. 4006 . . . . .	6.1	11 45 52.575	+0.0029	4 46 19.02	-0.022	
14 Virginis . . . . .	6.9	12 14 8.346	+0.0022	8 21 12.66	-0.043	
$\gamma$ Virginis . . . . .	5.7	12 28 33.879	-0.0070	- 8 53 42.69	-0.014	
$\delta$ Virginis . . . . .	5.7	13 21 22.934	-0.0099	12 10 56.83	-0.041	
75 Virginis . . . . .	6.0	13 27 27.891	-0.0029	14 50 36.94	-0.012	
83 Virginis . . . . .	6.0	13 39 2.825	+0.0006	15 40 17.48	-0.031	
85 Virginis . . . . .	6.5	13 40 8.616	-0.0031	15 15 36.39	-0.043	
B. A. C. 4700 . . . . .	5.6	14 5 19.541	+0.0028	-15 49 29.59	-0.009	
B. A. C. 4722 . . . . .	5.8	14 9 50.092	-0.0027	17 43 46.65	-0.015	
B. A. C. 4923 . . . . .	7.3	14 51 33.6	+0.0691	20 57 28.97	-1.646	
$\iota^1$ Libræ . . . . .	5.0	15 6 27.733	-0.0041	19 24 34.44	-0.050	
$\iota^2$ Libræ . . . . .	6.5	15 7 33.893	-0.0043	19 16 1.24	-0.034	
42 Libræ . . . . .	5.7	15 34 18.549	-0.0022	-23 29 23.46	-0.033	
B. A. C. 5253 . . . . .	5.8	15 47 51.814	-0.0023	24 13 55.46	-0.030	
B. A. C. 5254 . . . . .	5.8	15 47 55.069	-0.0031	23 40 37.25	-0.017	
19 Scorpii . . . . .	5.1	16 14 33.403	-0.0023	23 55 35.43	-0.064	
$\sigma$ Scorpii . . . . .	3.4	16 15 2.837	-0.0022	25 21 1.46	-0.026	
$\rho$ Ophiuchi (south star) . . . . .	5.0	16 19 31.634	-0.0017	-23 12 52.40	-0.042	
22 Scorpii . . . . .	5.5	16 24 4.206	-0.0011	24 53 35.08	-0.038	
15 Ophiuchi . . . . .	7.3	16 39 3.918	-0.0048	22 59 44.46	-0.005	
25 Scorpii . . . . .	7.0	16 40 40.314	-0.0004	25 20 39.84	-0.004	
18 Ophiuchi . . . . .	6.7	16 43 35.468	-0.0027	24 27 49.37	-0.044	
22 Ophiuchi . . . . .	6.7	16 48 44.556	-0.0010	-23 20 48.13	-0.052	
24 Ophiuchi . . . . .	5.9	16 50 42.489	-0.0001	22 59 22.87	-0.006	
B. A. C. 5709 . . . . .	6.3	16 53 46.680	+0.0007	24 56 18.02	+0.011	
26 Ophiuchi . . . . .	6.1	16 53 58.178	+0.0015	24 50 6.32	-0.007	
31 Ophiuchi . . . . .	6.7	16 58 30.714	+0.0001	25 30 2.92	-0.008	
B. A. C. 5815 . . . . .	7.3	17 10 14.461	-0.0080	-25 11 25.50	.....	
39 Ophiuchi (south star) . . . . .	5.5	17 11 51.001	-0.0060	24 10 37.83	-0.035	
B. A. C. 5831 . . . . .	6.9	17 11 56.978	+0.0073	23 57 42.23	-0.104	
B. A. C. 5846 . . . . .	6.8	17 15 29.776	-0.0053	24 48 14.60	-0.040	
B. A. C. 5868 . . . . .	7.0	17 18 55.812	+0.0008	24 9 4.63	-0.007	
$\alpha^3$ Ophiuchi . . . . .	5.2	17 25 15.149	-0.0011	-23 53 4.52	-0.036	
52 Ophiuchi . . . . .	6.5	17 29 13.876	-0.0022	21 58 33.98	-0.050	
63 Ophiuchi . . . . .	6.6	17 48 41.124	-0.0004	24 52 0.23	+0.002	
B. A. C. 6066 . . . . .	7.3	17 50 57.142	-0.0001	23 55 29.37	-0.022	
4 Sagittarii . . . . .	5.4	17 53 37.586	-0.0006	23 48 24.85	-0.066	
5 Sagittarii . . . . .	7.0	17 54 0.095	+0.0031	-24 16 33.45	-0.035	
7 Sagittarii . . . . .	5.9	17 56 39.719	-0.0018	24 16 52.71	-0.013	
Piazzi 17 <sup>h</sup> 330 . . . . .	5.3	17 57 29.6	.....	23 8 25.4	.....	
9 Sagittarii . . . . .	6.0	17 57 40.800	-0.0020	24 21 46.51	-0.026	
Piazzi 17 <sup>h</sup> 334 . . . . .	5.3	17 57 48.480	-0.0023	22 50 22.53	0.000	
B. A. C. 6161 . . . . .	5.7	18 5 33.534	+0.0003	-23 43 20.54	-0.070	
14 Sagittarii . . . . .	6.0	18 8 11.621	-0.0038	21 44 23.93	-0.034	
B. A. C. 6304 . . . . .	7.0	18 27 3.890	-0.0014	24 10 59.72	-0.021	
24 Sagittarii . . . . .	5.9	18 27 43.283	-0.0012	-24 6 26.25	-0.009	

MEAN PLACES FOR 1899.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.140, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
25 Sagittarii . . . . .	6.3	18 28 22.340	+0.0049	-24 17 56.26	+0.009
B. A. C. 6336 . . . . .	6.2	18 31 51.572	-0.0029	21 28 53.83	-0.107
B. A. C. 6343 . . . . .	6.3	18 32 22.128	-0.0014	23 35 28.12	-0.033
B. A. C. 6347 . . . . .	6.0	18 32 52.043	-0.0063	21 8 7.58	-0.156
26 Sagittarii . . . . .	6.6	18 35 41.990	+0.0012	23 55 38.89	-0.030
28 Sagittarii . . . . .	5.6	18 40 15.117	+0.0006	-22 29 53.74	-0.022
B. A. C. 6386 . . . . .	7.3	18 41 52.830	-0.0008	20 23 3.14	-0.034
29 Sagittarii . . . . .	5.5	18 43 40.515	-0.0008	20 26 22.67	+0.014
30 Sagittarii . . . . .	6.6	18 44 46.160	-0.0050	22 16 40.57	-0.038
31 Sagittarii . . . . .	7.0	18 46 4.322	-0.0003	22 2 23.87	-0.044
33 Sagittarii . . . . .	6.0	18 47 57.932	-0.0005	-21 28 59.59	-0.006
✓ Sagittarii . . . . .	5.0	18 48 4.242	-0.0019	22 52 9.19	-0.031
✓ Sagittarii . . . . .	5.1	18 49 0.787	+0.0062	22 47 50.58	-0.025
B. A. C. 6448 . . . . .	6.4	18 49 53.787	-0.0003	23 18 7.87	-0.018
♄ Sagittarii . . . . .	5.7	18 51 20.341	-0.0020	20 47 18.97	-0.029
♄ Sagittarii . . . . .	3.5	18 51 42.296	+0.0019	-21 14 21.65	-0.022
♄ Sagittarii . . . . .	3.8	18 58 37.856	+0.0041	21 53 22.17	-0.073
♄ Sagittarii . . . . .	3.1	19 3 45.468	-0.0014	21 11 3.14	-0.044
B. A. C. 6607 . . . . .	5.9	19 14 35.080	-0.0009	22 35 27.00	-0.020
50 Sagittarii . . . . .	5.9	19 20 17.707	+0.0004	21 58 35.96	-0.009
B. A. C. 6658 . . . . .	7.3	19 22 12.7	.....	-18 33 47.11	+0.025
B. A. C. 6707 . . . . .	6.4	19 30 32.901	+0.0016	19 4 32.13	-0.003
B. A. C. 6710 . . . . .	5.8	19 31 11.843	+0.0022	18 27 21.79	-0.056
f Sagittarii . . . . .	5.2	19 40 28.240	-0.0106	20 0 14.36	-0.096
57 Sagittarii . . . . .	6.1	19 46 19.947	+0.0004	19 18 5.68	-0.066
B. A. C. 6992 . . . . .	6.7	20 15 6.092	+0.0012	-15 6 12.19	-0.004
♄ Capricorni . . . . .	3.2	20 15 20.232	+0.0019	15 6 1.46	-0.003
♄ Capricorni . . . . .	5.3	20 23 6.040	-0.0013	18 8 51.24	-0.020
B. A. C. 7087 . . . . .	6.3	20 28 33.984	-0.0002	14 4 5.35	+0.052
♄ Capricorni . . . . .	7.0	20 31 41.514	+0.0052	15 29 49.89	-0.040
♄ Capricorni . . . . .	5.6	20 33 37.556	+0.0001	-15 18 33.01	-0.029
8 Aquarii . . . . .	6.8	20 54 21.830	-0.0030	13 26 41.14	-0.012
9 Aquarii . . . . .	6.8	20 55 34.375	-0.0017	13 55 31.01	-0.013
✓ Aquarii . . . . .	4.7	21 4 5.580	+0.0055	11 46 50.39	-0.016
18 Aquarii . . . . .	5.7	21 18 40.467	+0.0061	13 18 42.26	-0.008
19 Aquarii . . . . .	5.8	21 19 47.354	-0.0008	-10 10 42.70	-0.170
B. A. C. 7562 . . . . .	5.5	21 39 32.168	+0.0047	9 30 3.45	0.000
♄ Capricorni . . . . .	5.5	21 39 37.141	-0.0005	9 32 46.96	-0.005
♄ Capricorni . . . . .	6.4	21 40 52.943	-0.0008	9 44 32.17	-0.007
30 Aquarii . . . . .	5.8	21 57 57.688	+0.0015	7 0 38.09	+0.001
B. A. C. 7704 . . . . .	7.3	22 2 23.994	-0.0022	-6 19 20.2	....
36 Aquarii . . . . .	6.3	22 4 6.414	+0.0021	8 40 56.22	+0.045
B. A. C. 7717 . . . . .	6.9	22 4 10.152	+0.0073	8 1 23.0	....
B. A. C. 7744 . . . . .	6.7	22 7 28.343	-0.0038	5 13 7.09	-0.026
B. A. C. 7752 . . . . .	6.7	22 8 36.290	+0.0072	4 57 7.0	....
44 Aquarii . . . . .	6.4	22 11 50.106	-0.0014	-5 53 29.12	+0.031
51 Aquarii . . . . .	5.8	22 18 51.246	+0.0012	5 20 53.83	-0.002
κ Aquarii . . . . .	5.2	22 32 31.608	-0.0051	4 44 56.52	-0.122
Lalande 44337 . . . . .	6.3	22 35 34.0	.....	4 4 42.0	....
3 Piscium . . . . .	6.4	22 55 26.907	-0.0031	-0 21 22.11	+0.021
W <sup>3</sup> 22 <sup>b</sup> 1220 . . . . .	6.6	23 0 7.6	.....	+0 45 47.2	....
κ Piscium . . . . .	4.7	23 21 45.268	+0.0046	0 42 8.69	-0.111
9 Piscium . . . . .	6.6	23 22 4.410	+0.0032	0 34 2.46	-0.051
16 Piscium . . . . .	5.8	23 31 14.037	-0.0080	1 32 30.09	+0.056
19 Piscium . . . . .	4.9	23 41 13.806	-0.0039	+2 55 34.97	-0.032

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
10 Geminorum	7.0	+2.84	+ 0.1	+23 38.4	23 5 46.9	- 4 13.6	+0.3293	0.5451	-0.0621	+61	- 3
11 Geminorum	7.3	2.84	0.1	23 30.6	5 58.7	- 4 2.2	+0.4626	0.5450	0.0625	+71	+ 4
12 Geminorum	7.5	2.83	+ 0.1	23 18.9	6 0.5	- 4 0.4	+0.6754	0.5450	0.0626	+90	+15
<i>d</i> Geminorum	6.0	2.90	- 2.4	21 52.8	21 8.3	+10 37.6	+1.0924	0.5404	0.0929	+90	+40
44 Geminorum	6.0	2.93	3.2	22 47.3	24 3 40.0	- 7 3.4	-0.5637	0.5381	0.1052	+ 9	-58
<i>δ</i> Geminorum	3.5	+2.95	- 4.3	+22 10.0	10 48.2	- 0 8.9	-0.6718	0.5354	-0.1182	+ 3	-66
56 Geminorum	5.7	2.93	4.7	20 38.0	11 43.3	+ 0 44.4	+0.9243	0.5351	0.1199	+90	+25
61 Geminorum	6.0	2.93	4.9	20 27.5	14 8.5	+ 3 5.0	+0.8239	0.5341	0.1241	+90	+18
63 Geminorum	5.7	2.95	4.9	21 39.0	14 30.7	+ 3 26.6	-0.5480	0.5340	0.1247	+10	-59
79 Geminorum	6.3	2.95	6.2	20 33.4	23 3.1	+11 42.9	-0.5595	0.5305	0.1391	+15	-55
85 Geminorum	6.0	+2.95	- 6.9	+20 8.9	25 4 15.7	- 7 14.3	-0.7516	0.5284	-0.1473	- 2	-67
B. A. C. 2658	7.2	2.93	7.3	18 31.2	6 47.6	- 4 47.1	+0.6812	0.5273	0.1512	+90	+ 6
<i>ζ</i> Cancri	4.8	2.92	8.1	17 57.0	12 34.5	+ 0 49.3	+0.4173	0.5249	0.1597	+67	- 9
<i>d</i> Cancri	6.0	2.92	8.7	18 39.2	18 12.4	+ 6 16.9	-1.2883	0.5228	0.1676	-47	-71
B. A. C. 2810	7.0	2.91	8.8	17 30.6	18 55.9	+ 6 59.1	-0.1378	0.5225	0.1686	+33	-39
<i>d</i> Cancri	6.0	+2.91	- 8.9	+17 22.6	19 29.6	+ 7 31.8	-0.0851	0.5222	-0.1693	+36	-37
54 Cancri	6.3	2.85	10.4	15 43.3	26 8 27.8	- 3 53.1	-0.5505	0.5172	0.1855	+11	-66
<i>o</i> Cancri	5.7	2.84	10.7	15 42.4	11 41.4	- 0 45.2	-1.1380	0.5161	0.1892	-27	-74
<i>ξ</i> Leonis	5.3	2.74	12.2	11 44.6	27 6 3.3	- 6 55.2	-0.3870	0.5101	0.2071	+20	-59
<i>λ</i> Leonis	5.7	2.73	12.1	10 9.5	6 4.7	- 6 53.8	+1.3650	0.5101	0.2071	+90	+59
<i>o</i> Leonis	3.8	+2.71	-12.6	+10 20.9	10 59.7	- 2 7.3	+0.1254	0.5088	-0.2111	+47	-31
10 Sextantis	6.0	2.67	13.1	9 24.5	19 13.2	+ 5 52.3	-0.5949	0.5068	0.2169	+ 9	-75
11 Sextantis	6.0	2.66	13.1	8 47.5	20 8.1	+ 6 45.6	-0.1132	0.5066	0.2175	+34	-44
<i>π</i> Leonis	5.0	2.65	13.2	8 31.5	21 16.1	+ 7 51.7	-0.0647	0.5064	0.2182	+37	-42
16 Sextantis	6.9	2.62	13.3	6 39.7	28 2 10.5	-11 22.1	+0.9146	0.5056	0.2212	+90	+11
43 Leonis	6.5	+2.58	-13.8	+ 7 3.1	9 38.4	- 4 6.7	-1.1801	0.5045	-0.2249	-29	-83
34 Sextantis	6.7	2.50	13.8	4 6.4	20 21.1	+ 6 18.1	-0.3681	0.5036	0.2290	+21	-62
36 Sextantis	6.6	2.49	13.7	3 0.9	21 44.2	+ 7 38.8	+0.5144	0.5037	0.2293	+72	-13
55 Leonis	6.2	2.46	13.6	1 16.3	29 3 29.2	-10 45.8	+1.1061	0.5037	0.2307	+90	+23
<i>ρ</i> <sup>3</sup> Leonis	5.4	2.43	13.7	0 32.3	7 48.0	- 6 34.2	+0.9117	0.5039	0.2314	+90	+ 9
<i>ρ</i> <sup>6</sup> Leonis	5.7	+2.39	-13.8	+ 0 28.6	13 18.9	- 1 12.6	-0.2979	0.5042	-0.2320	+25	-57
<i>ε</i> Leonis	5.3	2.33	13.4	- 2 27.0	22 16.8	+ 7 30.2	-0.8197	0.5055	0.2319	+88	+ 3
B. A. C. 4006	6.1	2.25	12.9	4 46.5	30 9 24.5	- 5 41.0	+0.7772	0.5079	0.2302	+76	+ 1
14 Virginis	6.9	2.15	12.1	8 21.4	31 0 20.9	+ 8 49.7	+1.2505	0.5130	0.2250	+82	+36
<i>γ</i> Virginis	5.7	+2.09	-12.0	- 8 53.9	7 50.6	- 7 53.9	+0.1609	0.5162	-0.2211	+47	-32

## FEBRUARY.

75 Virginis	6.0	+1.87	- 9.5	-14 50.8	1 13 16.4	- 3 22.2	+0.3492	0.5337	-0.1961	+54	-22
83 Virginis	6.0	1.82	8.9	15 40.4	18 49.1	+ 1 59.9	+0.1576	0.5374	0.1896	+42	-32
85 Virginis	6.5	+1.81	- 9.0	-15 15.8	19 20.3	+ 2 30.1	-0.3768	0.5378	-0.1890	+14	-63
B. A. C. 4722	5.8	1.69	7.7	17 43.9	2 9 0.0	- 8 8.6	-0.2507	0.5484	0.1699	+18	-55
B. A. C. 4923	7.3	1.52	5.8	20 57.6	8 3 39.5	+ 9 43.1	-0.2665	0.5636	0.1379	+42	-26
42 Libræ	5.7	1.35	4.0	23 29.5	21 38.1	+ 3 2.0	+0.7345	0.5783	0.0997	+66	+ 2
B. A. C. 5253	5.8	1.29	3.4	24 14.0	4 3 9.2	+ 8 20.4	+0.9793	0.5825	0.0866	+66	+18
B. A. C. 5254	5.8	+1.29	- 3.6	-23 40.7	3 10.5	+ 8 21.7	+0.4084	0.5825	-0.0865	+45	-17
<i>δ</i> Scorpii	2.6	1.23	3.9	22 20.1	5 46.2	+10 51.3	-1.1830	0.5845	0.0802	-50	-90
19 Scorpii	5.1	1.16	3.0	23 55.6	13 48.4	- 5 25.3	-0.1167	0.5902	0.0597	+15	-48
<i>ρ</i> Ophiuchi ( <i>S. star</i> )	5.0	1.13	3.1	23 12.9	15 45.6	- 3 32.7	-0.9525	0.5911	0.0545	-34	-90
22 Scorpii	5.5	1.13	2.5	24 53.6	17 32.4	- 1 50.2	-0.6618	0.5924	0.0498	+61	- 3
25 Scorpii	7.0	+1.05	- 2.0	-25 20.7	23 59.6	+ 4 21.4	+0.8517	0.5962	-0.0322	+65	+10
18 Ophiuchi	6.7	1.03	2.2	24 27.9	5 1 7.2	+ 5 26.3	-0.0746	0.5967	0.0291	+13	-45
22 Ophiuchi	6.7	1.00	2.5	23 20.8	3 6.3	+ 7 20.6	-1.2557	0.5977	0.0235	-64	-90
B. A. C. 5709	6.3	0.99	1.9	24 56.3	5 2.2	+ 9 11.7	+0.3123	0.5987	0.0181	+33	-23
26 Ophiuchi	6.1	0.99	1.9	24 50.1	5 6.6	+ 9 15.9	+0.2068	0.5987	0.0179	+27	-29
31 Ophiuchi	6.7	+0.98	- 1.6	-25 30.1	6 50.9	+10 56.0	+0.8511	0.5995	-0.0130	+64	+10

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	$\gamma$	$\alpha$	$\gamma'$	$\Lambda'$	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				'	"
<i>d</i> Piscium	5.3	+0.76	+7.0	+7 37.9	16 7 59.7	+3 29.3	-0.2241	0.5368	+0.2355	+29	-52
45 Piscium	6.9	0.79	6.9	7 8.1	10 25.2	+5 50.1	+0.8568	0.5365	0.2334	+90	+7
58 Piscium	5.0	0.91	8.4	11 25.5	20 33.4	-8 21.3	-1.2684	0.5360	0.2239	-39	-79
75 Piscium	6.0	1.04	8.7	12 25.0	17 5 51.2	+0 38.6	-0.2717	0.5361	0.2136	+26	-52
<i>7</i> Piscium	3.7	1.18	9.3	14 49.7	17 40.3	-11 55.3	-0.3660	0.5371	0.1986	+21	-55
101 Piscium	6.3	+1.21	+9.2	+14 8.8	19 42.5	-9 57.1	+0.7529	0.5373	+0.1957	+90	+6
103 Piscium	6.8	1.22	9.1	16 6.9	21 20.4	-8 22.3	-1.0063	0.5375	0.1935	-18	-74
105 Piscium	6.3	1.23	9.7	15 53.8	21 32.4	-8 10.7	-0.7364	0.5376	0.1932	0	-73
3 Arietis	6.0	1.28	10.0	16 54.6	18 0 47.6	-5 1.9	-1.1883	0.5380	0.1885	-33	-73
4 Arietis	5.7	1.29	9.8	16 27.3	1 33.0	-4 17.9	-0.5662	0.5381	0.1874	+10	-67
<i>i</i> Arietis	5.7	+1.35	+10.0	+17 19.6	5 51.9	-0 7.4	-0.6964	0.5385	+0.1808	+3	-73
B. A. C. 686	7.2	1.47	10.3	19 8.7	13 35.8	+7 21.2	-1.2823	0.5402	0.1687	-47	-71
<i>0</i> Arietis	5.7	1.49	10.3	19 26.2	15 35.4	+9 17.0	-1.2630	0.5405	0.1654	-44	-71
23 Arietis	7.5	1.50	10.3	19 13.7	16 4.1	+9 44.7	-0.9619	0.5406	0.1646	-15	-71
26 Arietis	6.0	1.57	10.1	19 24.6	21 25.5	-9 4.5	-0.3005	0.5417	0.1555	+24	-47
B. A. C. 782	7.0	+1.58	+9.7	+18 26.2	22 49.0	-7 43.8	+0.9563	0.5419	+0.1530	+90	+23
<i>u</i> Arietis	6.0	1.64	9.9	19 35.0	19 52.6	-3 48.1	+0.3345	0.5428	0.1458	+60	-11
47 Arietis	6.0	1.77	9.6	20 16.0	10 7.9	+3 12.8	+0.6114	0.5442	0.1324	+84	+5
B. A. C. 920	7.0	1.78	9.2	21 13.1	10 29.7	+3 33.8	-0.3674	0.5443	0.1317	+20	-48
<i>e</i> Arietis	4.6	1.78	9.8	20 56.4	10 39.2	+3 43.1	-0.0451	0.5444	0.1317	+38	-30
<i>5</i> Arietis	4.8	+1.87	+9.2	+20 40.4	17 52.9	+10 42.2	+1.1448	0.5458	+0.1181	+90	+42
B. A. C. 1055	6.8	1.94	9.2	21 41.2	22 18.0	-9 1.5	+0.5481	0.5466	0.1088	+78	+4
66 Arietis	6.0	2.00	9.2	22 27.5	20 0 3.5	-7 19.6	-0.0995	0.5469	0.1052	+35	-30
9 Tauri	7.0	2.05	9.1	22 52.7	3 56.7	-3 34.3	-0.1638	0.5476	0.0973	+31	-33
<i>g</i> Pleiadum	6.3	2.10	9.0	23 58.4	7 30.1	-0 8.1	-1.0224	0.5482	0.0900	-22	-66
17 Tauri	4.3	+2.10	+8.9	+23 47.9	7 32.2	-0 6.1	-0.8276	0.5482	+0.0899	-7	-66
19 Tauri	5.0	2.10	9.1	24 9.2	7 40.9	+0 2.4	-1.2007	0.5482	0.0896	-40	-66
20 Tauri	5.0	2.11	9.1	24 3.3	7 57.9	+0 18.8	-1.0686	0.5483	0.0890	-26	-66
21 Tauri	7.0	2.12	9.1	24 14.5	8 0.0	+0 20.8	-1.2690	0.5483	0.0890	-53	-66
22 Tauri	7.0	2.12	9.1	24 12.9	8 3.8	+0 24.5	-1.2345	0.5483	0.0888	-45	-66
23 Tauri	4.7	+2.11	+8.9	+23 38.2	8 12.0	+0 32.4	-0.5923	0.5483	+0.0885	+7	-58
<i>7</i> Tauri	3.1	2.12	8.9	23 47.7	8 43.5	+1 2.8	-0.7195	0.5484	0.0874	-1	-66
B. A. C. 1170	6.3	2.12	8.7	23 6.8	9 7.8	+1 26.3	+0.0584	0.5484	0.0866	+44	-20
26 Tauri	7.0	2.12	8.8	23 33.0	9 23.7	+1 41.7	-0.3943	0.5485	0.0860	+18	-45
27 Tauri	4.0	2.13	8.8	23 44.8	9 29.4	+1 47.2	-0.6009	0.5485	0.0858	+7	-59
28 Tauri	6.2	+2.13	+8.8	+23 49.8	9 30.0	+1 47.8	-0.6908	0.5485	+0.0858	+1	-65
33 Tauri	6.3	2.17	8.2	22 53.1	13 6.2	+5 16.7	+0.6359	0.5490	0.0782	+88	+12
B. A. C. 1238	6.3	2.19	8.1	22 55.2	14 52.0	+6 58.9	+0.7330	0.5492	0.0745	+90	+18
36 Tauri	6.0	2.22	8.2	23 49.8	16 24.1	+8 27.9	-0.1494	0.5494	0.0712	+32	-29
B. A. C. 1347	7.3	2.33	7.4	24 10.4	21 1 4.5	-7 9.3	+0.0123	0.5502	0.0525	+41	-19
62 Tauri	6.0	+2.33	+7.3	+24 4.0	1 18.2	-6 56.1	+0.1397	0.5502	+0.0520	+49	-12
95 Tauri	6.3	2.44	6.2	23 53.9	10 1.3	+1 29.2	+0.6959	0.5506	0.0329	+90	+20
B. A. C. 1463	6.3	2.45	5.8	23 26.7	11 9.3	+2 34.9	+1.2320	0.5506	0.0304	+90	+60
99 Tauri	6.0	2.50	5.3	23 47.5	16 38.1	+7 52.5	+0.9847	0.5507	0.0183	+90	+39
<i>A</i> Tauri	6.0	2.53	5.4	24 53.7	16 46.3	+8 0.5	-0.2275	0.5506	0.0180	+28	-28
103 Tauri	6.0	+2.57	+4.8	+24 8.0	21 18.2	-11 36.9	+0.6717	0.5504	+0.0080	+90	+20
118 Tauri	5.7	2.68	3.8	25 4.2	22 6 54.9	-2 19.8	-0.3864	0.5495	-0.0132	+19	-38
121 Tauri	6.0	2.69	3.1	23 58.4	9 45.5	+0 25.1	+0.7790	0.5492	0.0194	+90	+26
132 Tauri	5.3	2.75	2.3	24 32.1	15 57.4	+6 24.5	-0.0032	0.5482	0.0329	+40	-18
1 Geminorum	5.0	2.78	1.0	23 16.1	22 56.4	-10 50.5	+1.1165	0.5467	0.0478	+90	+46
2 Geminorum	7.2	+2.79	+1.0	+23 38.9	23 42.7	-10 5.8	+0.6593	0.5466	-0.0494	+90	+16
3 Geminorum	6.3	2.80	0.6	23 7.8	23 1 32.2	-8 19.8	+1.1394	0.5462	0.0532	+90	+48
4 Geminorum	7.4	2.80	0.6	23 0.9	1 53.7	-7 59.1	+1.2462	0.5461	0.0540	+90	+60
5 Geminorum	6.7	2.83	0.8	24 26.5	2 20.7	-7 32.9	-0.3615	0.5460	0.0550	+20	-40
8 Geminorum	6.5	2.84	0.4	24 0.1	4 34.3	-5 23.7	+0.0018	0.5454	0.0583	+41	-20
9 Geminorum	6.3	+2.83	+0.3	+23 46.5	4 53.0	-5 5.7	+0.2354	0.5453	-0.0602	+55	-8



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
B. A. C. 782	7.0	+1.19	+7.9	+18 26.2	15 6 17.2	+ 1 32.1	+0.7644	0.5493	+0.1549	+90	+11
$\mu$ Arietis	6.0	1.26	8.3	19 35.0	10 14.6	+ 5 21.5	+0.1500	0.5497	0.1476	+49	-21
47 Arietis	6.0	1.36	8.2	20 16.0	17 19.8	-11 47.8	+0.4236	0.5505	0.1339	+67	- 6
B. A. C. 920	7.0	1.37	8.5	21 13.1	17 41.2	-11 27.1	-0.5432	0.5505	0.1332	+10	-59
$\epsilon$ Arietis	4.6	1.37	8.4	20 56.3	17 50.5	-11 18.1	-0.2249	0.5505	0.1329	+28	-40
$\zeta$ Arietis	4.8	+1.47	+7.9	+20 40.3	16 0 55.0	- 4 28.0	+0.9518	0.5512	+0.1188	+90	+27
$\tau_1$ Arietis	5.0	1.51	7.8	20 47.1	3 45.6	- 1 43.3	+1.1623	0.5514	0.1129	+90	+45
B. A. C. 1055	6.8	1.54	8.0	21 41.2	5 15.1	- 0 16.8	+0.3627	0.5516	0.1099	+63	- 6
66 Arietis	6.0	1.57	8.2	22 27.5	6 58.7	+ 1 23.2	-0.2787	0.5517	0.1063	+25	-40
9 Tauri	7.0	1.63	8.1	22 52.7	10 48.0	+ 5 4.7	-0.3406	0.5519	0.0983	+21	-43
$g$ Pleiadum	6.3	+1.69	+8.2	+23 58.4	14 17.8	+ 8 27.2	-1.1906	0.5521	+0.0909	-39	-66
17 Tauri	4.3	1.69	8.2	23 47.9	14 19.9	+ 8 29.3	-0.9977	0.5521	0.0908	-20	-66
20 Tauri	5.0	1.70	8.2	24 3.3	14 45.3	+ 8 53.8	-1.2361	0.5522	0.0899	-46	-66
23 Tauri	4.7	1.70	8.1	23 38.2	14 59.2	+ 9 7.3	-0.7643	0.5522	0.0894	- 4	-66
$\eta$ Tauri	3.1	1.71	8.1	23 47.7	15 30.2	+ 9 37.1	-0.8902	0.5522	0.0884	-12	-66
B. A. C. 1170	6.3	+1.71	+7.8	+23 6.8	15 54.1	+10 0.2	-0.1196	0.5522	+0.0874	+34	-29
26 Tauri	7.0	1.72	7.9	23 33.0	16 9.8	+10 15.5	-0.5679	0.5522	0.0869	+ 8	-57
27 Tauri	4.0	1.72	8.0	23 44.8	16 15.4	+10 20.8	-0.7726	0.5522	0.0867	- 4	-66
28 Tauri	6.2	1.72	8.0	23 49.8	16 15.9	+10 21.3	-0.8618	0.5522	0.0867	-10	-66
32 Tauri	6.0	1.75	7.2	22 11.4	19 44.2	-10 17.6	+1.1987	0.5523	0.0792	+90	+52
33 Tauri	6.3	+1.76	+7.4	+22 53.1	19 49.0	-10 12.9	+0.4537	0.5523	+0.0790	+70	+ 2
B. A. C. 1238	6.3	1.79	7.3	22 55.1	21 33.4	- 8 32.1	+0.5507	0.5524	0.0753	+79	+ 8
36 Tauri	6.0	1.82	7.5	23 49.8	23 4.3	- 7 4.3	-0.3236	0.5525	0.0720	+22	-39
B. A. C. 1347	7.3	1.95	6.8	24 10.4	17 7 38.8	+ 1 12.5	-0.1598	0.5526	0.0532	+31	-28
62 Tauri	6.0	1.95	6.8	24 4.0	7 52.4	+ 1 25.6	-0.0333	0.5526	0.0527	+39	-21
95 Tauri	6.3	+2.07	+5.9	+23 53.9	16 30.8	+ 9 46.2	+0.5235	0.5519	+0.0336	+77	+10
B. A. C. 1463	6.3	2.08	5.6	23 26.6	17 38.3	+10 51.4	+1.0569	0.5518	0.0310	+90	+43
99 Tauri	6.0	2.16	5.1	23 47.5	23 5.0	- 7 53.1	+0.8147	0.5513	0.0190	+90	+28
$k$ Tauri	6.0	2.18	5.5	24 53.7	23 13.0	- 7 45.4	-0.3906	0.5513	0.0187	+18	-39
103 Tauri	6.0	2.23	4.7	24 8.0	18 3 43.6	- 3 24.0	+0.5066	0.5507	+0.0087	+75	+11
118 Tauri	5.7	+2.37	+3.9	+25 4.2	13 18.2	+ 5 51.1	-0.5398	0.5492	-0.0124	+10	-48
121 Tauri	6.0	2.38	3.2	23 58.4	16 8.4	+ 8 35.6	+0.6229	0.5487	0.0185	+88	+17
132 Tauri	5.3	2.48	2.6	24 32.1	22 19.8	- 9 25.5	-0.1513	0.5486	0.0319	+32	-25
1 Geminorum	5.0	2.53	1.3	23 16.1	19 5 18.5	- 2 40.9	+0.9709	0.5456	0.0467	+90	+35
2 Geminorum	7.2	2.55	1.3	23 38.9	6 4.9	- 1 56.1	+0.5166	0.5454	0.0483	+76	+ 8
3 Geminorum	6.3	+2.56	+0.9	+23 7.8	7 54.2	- 0 10.4	+0.9969	0.5449	-0.0522	+90	+37
4 Geminorum	7.4	2.56	0.8	23 0.9	8 16.1	+ 0 10.7	+1.1057	0.5448	0.0529	+90	+46
5 Geminorum	6.7	2.60	1.2	24 26.6	8 42.8	+ 0 36.6	-0.4964	0.5447	0.0538	+12	-49
6 Geminorum	6.7	2.57	0.7	22 55.9	9 6.5	+ 0 59.5	+1.1520	0.5446	0.0546	+90	+50
8 Geminorum	6.5	2.61	0.8	24 0.1	10 56.6	+ 2 46.0	-0.1352	0.5440	0.0584	+33	-27
9 Geminorum	6.3	+2.61	+0.7	+23 46.5	11 15.3	+ 3 4.0	+0.0980	0.5439	-0.0590	+46	-15
10 Geminorum	7.0	2.62	0.5	23 38.4	12 9.2	+ 3 56.1	+0.1928	0.5437	0.0609	+52	-10
11 Geminorum	7.3	2.62	0.5	23 30.6	12 21.1	+ 4 7.6	+0.3257	0.5436	0.0613	+61	- 4
12 Geminorum	7.5	2.61	+0.4	23 19.0	12 22.9	+ 4 9.4	+0.5379	0.5436	0.0614	+78	+ 8
$\mu$ Geminorum	3.2	2.62	0.0	22 33.9	14 3.8	+ 5 47.0	+1.2626	0.5431	0.0648	+90	+63
$d$ Geminorum	6.0	+2.74	-2.1	+21 52.8	20 3 32.1	- 5 11.1	+0.9704	0.5388	-0.0914	+90	+31
44 Geminorum	6.0	2.81	2.7	22 47.3	10 4.7	+ 1 8.9	-0.6754	0.5365	0.1037	+ 2	-66
$\delta$ Geminorum	3.5	2.86	3.9	22 10.0	17 13.9	+ 8 4.3	-0.8880	0.5345	0.1165	- 4	-68
56 Geminorum	5.7	2.84	4.4	20 38.0	18 9.0	+ 8 57.8	+0.8204	0.5334	0.1182	+90	+18
61 Geminorum	6.0	2.85	4.7	20 27.5	20 34.5	+11 18.6	+0.7235	0.5327	0.1224	+90	+12
63 Geminorum	5.7	+2.87	-4.5	+21 39.0	20 56.7	+11 40.1	-0.6461	0.5326	-0.1230	+ 4	-65
79 Geminorum	6.3	2.90	6.0	20 33.4	21 5 30.2	- 4 2.5	-0.5465	0.5293	0.1373	+10	-60
85 Geminorum	6.0	2.92	6.8	20 8.9	10 43.2	+ 1 0.8	-0.8307	0.5273	0.1455	- 7	-70
B. A. C. 2658	7.2	2.91	7.6	18 31.2	13 15.3	+ 3 28.2	+0.6041	0.5264	0.1494	+83	+ 2
$\zeta_1$ Cancri	4.8	2.93	8.2	17 57.0	19 2.3	+ 9 4.6	+0.3491	0.5243	0.1579	+62	-12
B. A. C. 2810	7.0	+2.95	-9.1	+17 30.6	22 1 23.8	- 8 45.5	-0.1949	0.5221	-0.1668	+30	-42

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
B. A. C. 5815	7.3	+0.93	-1.5	-25 11.4	8 11 19.0	- 8 46.8	+0.5073	0.6014	-0.0001	+45	-12
39 Ophiuchi (S. star)	5.5	0.92	1.8	24 10.7	11 55.7	- 8 11.7	-0.5113	0.6016	+0.0016	-12	-76
B. A. C. 5831	6.9	0.91	1.8	23 57.7	11 58.0	- 8 9.4	-0.7279	0.6016	0.0017	-24	-90
B. A. C. 5846	6.8	0.90	1.5	24 48.3	13 18.7	- 6 52.1	+0.1239	0.6021	0.0056	+22	-33
$\theta$ Ophiuchi	3.3	0.90	1.5	24 54.0	13 25.8	- 6 45.3	+0.2199	0.6021	0.0060	+27	-28
B. A. C. 5868	7.0	+0.89	-1.6	-24 9.1	14 36.8	- 5 37.2	-0.5218	0.6025	+0.0094	-12	-77
$\delta$ Ophiuchi	4.4	0.88	1.6	24 5.0	15 5.7	- 5 9.5	-0.5860	0.6027	0.0108	-16	-83
$\alpha$ Ophiuchi	5.2	0.86	1.6	23 53.1	17 0.2	- 3 19.8	-0.7581	0.6033	0.0163	-25	-90
63 Ophiuchi	6.6	0.77	0.9	24 52.0	6 1 49.6	+ 5 7.7	+0.4827	0.6052	0.0421	+47	-13
B. A. C. 6066	7.3	0.76	1.1	23 55.5	2 40.7	+ 5 56.6	-0.4204	0.6053	0.0446	- 4	-68
4 Sagittarii	5.4	+0.75	-1.1	-23 48.5	3 40.8	+ 6 54.3	-0.4917	0.6055	+0.0475	- 8	-74
5 Sagittarii	7.0	0.75	1.0	24 16.6	3 49.3	+ 7 2.4	-0.0171	0.6055	0.0479	+18	-41
7 Sagittarii	5.9	0.74	0.9	24 16.9	4 49.2	+ 7 59.8	+0.0375	0.6056	0.0508	+21	-38
Piazzi 17 <sup>h</sup> 330	5.3	0.73	1.2	23 8.4	5 7.9	+ 8 17.7	-1.0835	0.6056	0.0517	-44	-90
9 Sagittarii	6.0	0.73	0.9	24 21.8	5 12.1	+ 8 21.8	+0.1384	0.6056	0.0521	+26	-32
B. A. C. 6161	5.7	+0.70	-0.9	-23 43.4	8 9.4	+11 11.6	-0.3332	0.6058	+0.0605	+ 2	-61
B. A. C. 6304	7.0	0.63	0.5	24 11.0	16 13.4	- 5 4.5	+0.7062	0.6056	0.0836	+65	0
24 Sagittarii	5.9	0.63	0.5	24 6.4	16 28.2	- 4 50.3	+0.6516	0.6056	0.0844	+62	- 3
25 Sagittarii	6.3	0.62	0.4	24 17.9	16 42.9	- 4 36.3	+0.8623	0.6056	0.0851	+66	+10
B. A. C. 6343	6.3	0.60	0.6	23 35.5	18 12.9	- 3 10.0	+0.2914	0.6054	0.0894	+38	-24
26 Sagittarii	6.6	+0.59	-0.5	-23 55.7	19 28.1	- 1 57.9	+0.7385	0.6053	+0.0929	+66	+ 2
28 Sagittarii	5.6	0.57	0.7	22 29.9	21 10.7	- 0 19.6	-0.5134	0.6050	0.0977	- 4	-75
30 Sagittarii	6.6	0.56	0.7	22 16.7	22 52.9	+ 1 18.4	-0.5605	0.6048	0.1024	- 6	-80
31 Sagittarii	7.0	0.55	0.7	22 2.4	23 22.3	+ 1 46.5	-0.7456	0.6047	0.1037	-17	-90
33 Sagittarii	6.0	0.55	0.8	21 29.0	7 0 5.0	+ 2 27.4	-1.2208	0.6045	0.1057	-53	-90
1 <sup>st</sup> Sagittarii	5.0	+0.55	-0.5	-22 52.2	0 7.5	+ 2 29.8	+0.1535	0.6045	0.1058	+32	-32
1 <sup>st</sup> Sagittarii	5.1	0.55	0.5	22 47.9	0 28.8	+ 2 50.3	+0.1203	0.6044	0.1068	+30	-33
B. A. C. 6448	6.4	0.54	0.4	23 18.1	0 48.8	+ 3 9.4	+0.6548	0.6044	0.1077	+63	- 3
$\sigma$ Sagittarii	3.8	0.52	0.6	21 53.4	4 6.8	+ 6 19.3	-0.3702	0.6036	0.1166	+ 5	-64
$\pi$ Sagittarii	3.1	0.50	0.6	21 11.1	6 3.3	+ 8 10.9	-0.8342	0.6031	0.1218	-20	-90
B. A. C. 6607	5.9	+0.48	-0.2	-22 35.5	10 10.0	-11 52.5	+1.0753	0.6018	+0.1326	+67	+25
50 Sagittarii	5.9	0.46	0.2	21 58.6	12 20.6	- 9 47.3	+0.7045	0.6011	0.1381	+68	+ 3
$\zeta$ Sagittarii	5.2	0.42	0.3	20 0.2	20 5.1	- 2 21.7	-0.0328	0.5980	0.1571	+27	-42
57 Sagittarii	6.1	0.41	0.4	19 18.1	22 21.1	- 0 11.1	-0.3607	0.5970	0.1623	+10	-63
$\rho$ Capricorni	5.3	0.34	0.0	18 8.9	8 12 46.0	-10 20.7	+1.0730	0.5896	0.1928	+72	+23
$\tau_1$ Capricorni	7.0	+0.30	-0.2	-15 29.8	16 11.5	- 7 3.2	-0.8528	0.5877	+0.1992	-13	-90
$\tau_2$ Capricorni	5.6	0.30	-0.2	-15 18.6	16 58.0	- 6 18.5	-0.8821	0.5845	0.2006	-15	-90
NEW MOON.											
$\kappa$ Piscium	4.7	0.36	+2.9	+ 0 42.2	11 16 57.1	- 8 55.7	+0.5551	0.5523	0.2530	+75	-11
9 Piscium	6.6	+0.36	+2.9	+ 0 34.1	17 5.7	- 8 47.4	+0.7264	0.5522	+0.2529	+90	- 2
16 Piscium	5.8	0.39	3.3	1 32.6	21 14.9	- 4 46.6	+0.8007	0.5511	0.2515	+90	+ 3
19 Piscium	4.9	0.41	3.7	2 55.6	18 1 47.7	- 0 23.1	+0.5524	0.5500	0.2496	+75	-11
36 Piscium	6.3	0.50	4.9	7 40.8	15 35.8	-11 2.9	-0.8574	0.5477	0.2406	- 6	-82
$\delta$ Piscium	5.3	0.52	4.9	7 37.8	17 26.7	- 9 15.7	-0.3640	0.5472	0.2391	+21	-60
45 Piscium	6.9	+0.54	+4.8	+ 7 8.0	19 47.1	- 7 0.0	+0.6976	0.5472	+0.2371	+90	- 2
75 Piscium	6.0	0.71	6.5	12 25.0	18 14 33.5	+11 8.8	-0.4292	0.5464	0.2170	+17	-61
$\eta$ Piscium	3.7	0.83	7.2	14 49.6	14 1 59.1	- 1 48.7	-0.5303	0.5468	0.2016	+12	-66
101 Piscium	6.3	0.86	7.1	14 8.8	3 57.5	+ 0 5.8	+0.5709	0.5469	0.1988	+78	- 5
103 Piscium	6.8	0.87	7.2	16 6.9	5 32.4	+ 1 37.5	-1.1626	0.5470	0.1964	-30	-74
105 Piscium	6.3	+0.88	+7.6	+15 53.7	5 43.9	+ 1 48.6	-0.8969	0.5470	+0.1960	-10	-74
3 Arietis	6.0	0.91	7.9	16 54.5	8 53.1	+ 4 51.5	-1.3435	0.5472	0.1913	-59	-73
4 Arietis	5.7	0.92	7.7	16 27.3	9 37.1	+ 5 34.0	-0.7310	0.5473	0.1902	+ 0	-73
1 Arietis	5.7	0.97	7.9	17 19.6	13 48.1	+ 9 36.6	-0.8619	0.5477	0.1835	- 8	-73
23 Arietis	7.5	1.11	8.4	19 13.7	23 42.9	- 4 48.7	-1.1268	0.5487	0.1667	-28	-71
26 Arietis	6.0	+1.18	+8.3	+19 24.6	15 4 55.7	+ 0 13.4	-0.4758	0.5492	+0.1574	+14	-57

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.												
FEBRUARY.												
THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m						
B. A. C. 782	7.0	+1.19	+7.9	+18 26.2	15 6 17.2	+ 1 32.1	+0.7644	0.5493	+0.1549	+90	+11	
$\mu$ Arietis	6.0	1.26	8.3	19 35.0	10 14.6	+ 5 21.5	+0.1500	0.5497	0.1476	+49	-21	
47 Arietis	6.0	1.36	8.2	20 16.0	17 19.8	-11 47.8	+0.4236	0.5505	0.1339	+67	- 6	
B. A. C. 920	7.0	1.37	8.5	21 13.1	17 41.2	-11 27.1	-0.5432	0.5505	0.1332	+10	-59	
$\epsilon$ Arietis	4.6	1.37	8.4	20 56.3	17 50.5	-11 18.1	-0.2249	0.5505	0.1329	+28	-40	
$\zeta$ Arietis	4.8	+1.47	+7.9	+20 40.3	16 0 55.0	- 4 28.0	+0.9518	0.5512	+0.1188	+90	+27	
$\gamma$ Arietis	5.0	1.51	7.8	20 47.1	3 45.6	- 1 43.3	+1.1623	0.5514	0.1129	+90	+45	
B. A. C. 1055	6.8	1.54	8.0	21 41.2	5 15.1	- 0 16.8	+0.3627	0.5516	0.1099	+63	- 6	
66 Arietis	6.0	1.57	8.2	22 27.5	6 58.7	+ 1 23.2	-0.2787	0.5517	0.1063	+25	-40	
9 Tauri	7.0	1.63	8.1	22 52.7	10 48.0	+ 5 4.7	-0.3406	0.5519	0.0983	+21	-43	
$\delta$ Pleiadum	6.3	+1.69	+8.2	+23 58.4	14 17.8	+ 8 27.2	-1.1906	0.5521	+0.0909	-39	-66	
17 Tauri	4.3	1.69	8.2	23 47.9	14 19.9	+ 8 29.3	-0.9977	0.5521	0.0908	-20	-66	
20 Tauri	5.0	1.70	8.2	24 3.3	14 45.3	+ 8 53.8	-1.2361	0.5522	0.0899	-46	-66	
23 Tauri	4.7	1.70	8.1	23 38.2	14 59.2	+ 9 7.3	-0.7643	0.5522	0.0894	- 4	-66	
$\eta$ Tauri	3.1	1.71	8.1	23 47.7	15 30.2	+ 9 37.1	-0.8902	0.5522	0.0884	-12	-66	
B. A. C. 1170	6.3	+1.71	+7.8	+23 6.8	15 54.1	+10 0.2	-0.1196	0.5522	+0.0874	+34	-29	
26 Tauri	7.0	1.72	7.9	23 33.0	16 9.8	+10 15.5	-0.5679	0.5522	0.0869	+ 8	-57	
27 Tauri	4.0	1.72	8.0	23 44.8	16 15.4	+10 20.8	-0.7726	0.5522	0.0867	- 4	-66	
28 Tauri	6.2	1.72	8.0	23 49.8	16 15.9	+10 21.3	-0.8618	0.5522	0.0867	-10	-66	
32 Tauri	6.0	1.75	7.2	22 11.4	19 44.2	-10 17.6	+1.1987	0.5523	0.0792	+90	+52	
33 Tauri	6.3	+1.76	+7.4	+22 53.1	19 49.0	-10 12.9	+0.4537	0.5523	+0.0790	+70	+ 2	
B. A. C. 1238	6.3	1.79	7.3	22 55.1	21 33.4	- 8 32.1	+0.5507	0.5524	0.0753	+79	+ 8	
36 Tauri	6.0	1.82	7.5	23 49.8	23 4.3	- 7 4.3	-0.3236	0.5525	0.0720	+22	-39	
B. A. C. 1347	7.3	1.95	6.8	24 10.4	17 38.8	+ 1 12.5	-0.1598	0.5526	0.0532	+31	-28	
62 Tauri	6.0	1.95	6.8	24 4.0	7 52.4	+ 1 25.6	-0.0333	0.5526	0.0527	+39	-21	
95 Tauri	6.3	+2.07	+5.9	+23 53.9	16 30.8	+ 9 46.2	+0.5235	0.5519	+0.0336	+77	+10	
B. A. C. 1463	6.3	2.08	5.6	23 26.6	17 38.3	+10 51.4	+1.0569	0.5518	0.0310	+90	+43	
99 Tauri	6.0	2.16	5.1	23 47.5	23 5.0	- 7 53.1	+0.8147	0.5513	0.0190	+90	+28	
$\kappa$ Tauri	6.0	2.18	5.5	24 53.7	23 13.0	- 7 45.4	-0.3906	0.5513	0.0187	+18	-39	
103 Tauri	6.0	2.23	4.7	24 8.0	18 3 43.6	- 3 24.0	+0.5066	0.5507	+0.0087	+75	+11	
118 Tauri	5.7	+2.37	+3.9	+25 4.2	13 18.2	+ 5 51.1	-0.5398	0.5492	-0.0124	+10	-48	
121 Tauri	6.0	2.38	3.2	23 58.4	16 8.4	+ 8 35.6	-0.6229	0.5487	0.0185	+88	-17	
132 Tauri	5.3	2.48	2.6	24 32.1	22 19.8	- 9 25.5	-0.1513	0.5486	0.0319	+32	-25	
1 Geminorum	5.0	2.53	1.3	23 16.1	19 5 18.5	- 2 40.9	+0.9709	0.5456	0.0467	+90	+35	
2 Geminorum	7.2	2.55	1.3	23 38.9	6 4.9	- 1 56.1	+0.5166	0.5454	0.0483	+76	+ 8	
3 Geminorum	6.3	+2.56	+0.9	+23 7.8	7 54.2	- 0 10.4	+0.9969	0.5449	-0.0522	+90	+37	
4 Geminorum	7.4	2.56	0.8	23 0.9	8 16.1	+ 0 10.7	+1.1057	0.5448	0.0529	+90	+46	
5 Geminorum	6.7	2.60	1.2	24 26.6	8 42.8	+ 0 36.6	-0.4964	0.5447	0.0538	+12	-49	
6 Geminorum	6.7	2.57	0.7	22 55.9	9 6.5	+ 0 59.5	+1.1520	0.5446	0.0546	+90	+50	
8 Geminorum	6.5	2.61	0.8	24 0.1	10 56.6	+ 2 46.0	-0.1352	0.5440	0.0584	+33	-27	
9 Geminorum	6.3	+2.61	+0.7	+23 46.5	11 15.3	+ 3 4.0	+0.0980	0.5439	-0.0590	+46	-15	
10 Geminorum	7.0	2.62	0.5	23 38.4	12 9.2	+ 3 56.1	+0.1928	0.5437	0.0609	+52	-10	
11 Geminorum	7.3	2.62	0.5	23 30.6	12 21.1	+ 4 7.6	+0.3257	0.5436	0.0613	+61	- 4	
12 Geminorum	7.5	2.61	+0.4	23 19.0	12 22.9	+ 4 9.4	+0.5379	0.5436	0.0614	+78	+ 8	
$\mu$ Geminorum	3.2	2.62	0.0	22 33.9	14 3.8	+ 5 47.0	+1.2626	0.5431	0.0648	+90	+63	
$\nu$ Geminorum	6.0	+2.74	-2.1	+21 52.8	20 3 32.1	- 5 11.1	+0.9704	0.5388	-0.0914	+90	+31	
44 Geminorum	6.0	2.81	2.7	22 47.3	10 4.7	+ 1 8.9	-0.6754	0.5365	0.1037	+ 2	-66	
$\rho$ Geminorum	3.5	2.86	3.9	22 10.0	17 13.9	+ 8 4.3	-0.8880	0.5345	0.1165	- 4	-68	
56 Geminorum	5.7	2.84	4.4	20 38.0	18 9.0	+ 8 57.8	+0.8204	0.5334	0.1182	+90	+18	
61 Geminorum	6.0	2.85	4.7	20 27.5	20 34.5	+11 18.6	+0.7235	0.5327	0.1224	+90	+12	
63 Geminorum	5.7	+2.87	-4.5	+21 39.0	20 56.7	+11 40.1	-0.6461	0.5326	-0.1230	+ 4	65	
79 Geminorum	6.3	2.90	6.0	20 33.4	21 5 30.2	- 4 2.5	-0.5465	0.5293	0.1373	+10	-60	
85 Geminorum	6.0	2.92	6.8	20 8.9	10 43.2	+ 1 0.8	-0.8307	0.5273	0.1455	- 7	-70	
B. A. C. 2658	7.2	2.91	7.6	18 31.2	13 15.3	+ 3 28.2	+0.6041	0.5264	0.1494	+83	+ 2	
$\zeta$ Cancri	4.8	2.93	8.2	17 57.0	19 2.3	+ 9 4.6	+0.3491	0.5243	0.1579	+62	-12	
B. A. C. 2810	7.0	+2.95	-9.1	+17 30.6	22 1 23.8	- 8 45.5	-0.1949	0.5221	-0.1668	+30	-42	

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>		
		$\Delta\alpha$	$\Delta\delta$										
		<i>s</i>	<i>"</i>	<i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>'</i>	<i>"</i>		
$\alpha$ Cancri	6.0	+2.95	-9.2	+17 22.6	22 1 57.6	-8 12.7	-0.1417	0.5219	-0.1676	+33	-40		
54 Cancri	6.3	2.97	11.0	15 43.3	14 55.0	+4 21.6	-0.5849	0.5175	0.1839	+9	-68		
$\alpha$ Cancri	5.7	2.97	11.4	15 42.4	18 8.2	+7 29.1	-1.1662	0.5165	0.1876	+30	-74		
$\epsilon$ Leonis	5.3	2.96	13.6	11 44.6	28 12 26.0	+1 15.0	-0.3830	0.5117	0.2059	+21	-59		
$\delta$ Leonis	5.7	2.94	13.8	10 9.4	12 27.4	+1 16.4	+1.3653	0.5117	0.2059	+90	+60		
$\sigma$ Leonis	3.8	+2.94	-14.4	+10 20.9	17 20.7	+6 1.2	+0.1372	0.5106	-0.2100	+48	-30		
10 Sextantis	6.0	2.94	15.0	9 24.4	24 1 31.0	-10 2.5	-0.5651	0.5092	0.2160	+10	-73		
11 Sextantis	6.0	2.93	15.1	8 47.5	2 25.5	-9 9.5	-0.0828	0.5090	0.2166	+36	-43		
$\pi$ Leonis	5.0	2.93	15.2	8 31.5	3 33.0	-8 3.9	-0.0322	0.5089	0.2174	+39	-40		
16 Sextantis	6.9	2.91	15.6	6 39.7	8 25.2	-3 20.0	+0.9538	0.5082	0.2204	+90	+15		
43 Leonis	6.5	+2.91	-16.1	+7 3.0	15 49.5	+3 51.8	-1.1215	0.5076	-0.2244	-24	-83		
34 Sextantis	6.7	2.87	16.7	4 6.4	25 2 26.2	-9 49.4	-0.2910	0.5073	0.2286	+25	-57		
36 Sextantis	6.6	2.87	16.8	3 0.9	3 48.5	-8 29.5	+0.5918	0.5073	0.2290	+79	-9		
55 Leonis	6.2	2.85	17.0	1 16.2	9 29.9	-2 57.6	+1.1932	0.5074	0.2305	+90	+30		
$f$ Leonis	5.4	2.84	17.2	+0 32.3	13 46.0	+1 11.3	+1.0075	0.5077	0.2313	+90	+16		
$f$ Leonis	5.7	+2.83	-17.3	+0 28.5	19 13.5	+6 29.5	-0.1889	0.5082	-0.2319	+30	-51		
$\epsilon$ Leonis	5.3	2.80	17.3	-2 27.1	26 4 5.8	-8 53.4	+0.9418	0.5096	0.2320	+88	+11		
B. A. C. 4006	6.1	2.77	17.2	4 46.6	15 6.6	+1 48.5	+0.9192	0.5121	0.2309	+85	+10		
$\eta$ Virginis	5.7	2.70	16.6	8 54.0	27 13 21.0	-0 36.1	+0.3389	0.5198	0.2210	+58	-22		
75 Virginis	6.0	+2.64	-14.4	-14 50.9	28 18 40.8	+3 49.6	+0.5622	0.5349	-0.1958	+68	-10		

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83 Virginis	6.0	+2.58	-13.7	-15 40.5	1 0 14.1	+9 12.2	+0.3746	0.5371	-0.1889	+55	-20
85 Virginis	6.5	2.58	13.8	15 15.8	0 45.4	+9 42.5	-0.1612	0.5387	0.1882	+25	-49
B. A. C. 4722	5.8	+2.51	-12.3	-17 44.0	14 38.3	-0 52.0	-0.0252	0.5478	-0.1688	+30	-42
B. A. C. 4923	7.3	2.40	9.8	20 57.6	2 9 21.5	-6 47.5	+0.5024	0.5606	0.1366	+57	-12
42 Libræ	5.7	2.26	7.3	23 29.5	8 3 40.4	+10 51.7	+0.9776	0.5728	0.0986	+67	+18
B. A. C. 5253	5.8	2.21	6.5	24 14.0	9 19.3	-7 42.1	+1.2255	0.5763	0.0856	+66	+44
B. A. C. 5254	5.8	2.20	6.7	23 40.7	9 20.7	-7 40.7	+0.6475	0.5763	0.0855	+62	-3
$\delta$ Scorpii	2.6	+2.16	-6.9	-22 20.2	12 0.3	-5 7.1	-0.9638	0.5767	-0.0793	-32	-90
19 Scorpii	5.1	2.10	5.5	23 55.7	20 15.4	+2 49.1	+0.1132	0.5822	0.0590	-26	-34
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	2.06	5.6	23 13.0	22 16.1	+4 45.3	-0.7348	0.5833	0.0540	-20	-90
22 Scorpii	5.5	2.06	4.8	24 53.7	4 0 6.1	+6 31.0	+0.9008	0.5843	0.0493	+65	+13
25 Scorpii	7.0	1.98	3.8	25 20.7	6 45.2	-11 5.4	+1.0910	0.5873	0.0321	+65	+29
18 Ophiuchi	6.7	+1.96	-4.0	-24 27.9	7 55.0	-9 58.3	+0.1506	0.5877	-0.0290	+25	-31
22 Ophiuchi	6.7	1.92	4.2	23 20.9	9 57.9	-8 0.2	-1.0493	0.5885	0.0236	-43	-90
B. A. C. 5709	6.3	1.92	3.4	24 56.4	11 57.6	-6 5.2	+0.5411	0.5892	0.0183	+49	-10
26 Ophiuchi	6.1	1.91	3.4	24 50.2	12 2.2	-6 0.8	+0.4339	0.5892	0.0181	+42	-16
31 Ophiuchi	6.7	1.90	3.0	25 30.1	13 50.0	-4 17.2	-1.0870	0.5898	0.0132	+64	+30
B. A. C. 5815	7.3	+1.84	-2.6	-25 11.5	18 27.3	+0 9.1	+0.7351	0.5913	-0.0007	+65	+2
39 Ophiuchi ( <i>S. star</i> )	5.5	1.83	2.9	24 10.7	19 5.3	+0 45.6	-0.3001	0.5915	+0.0010	-1	-60
B. A. C. 5831	6.9	1.82	3.0	23 57.8	19 7.6	+0 47.8	-0.5201	0.5915	0.0011	-13	-76
B. A. C. 5846	6.8	1.81	2.6	24 48.3	20 31.2	+2 8.1	+0.3443	0.5918	0.0049	+34	-21
$\theta$ Ophiuchi	3.3	1.81	2.5	24 54.0	20 38.5	+2 15.1	+0.4417	0.5919	0.0052	+41	-15
B. A. C. 5868	7.0	+1.79	-2.7	-24 9.1	21 52.0	+3 25.7	-0.3130	0.5922	+0.0085	-1	-60
$\delta$ Ophiuchi	4.4	1.78	2.6	24 5.0	22 21.9	+3 54.4	-0.3785	0.5923	0.0099	-5	-65
$\alpha$ Ophiuchi	5.2	1.75	2.5	23 53.1	5 0 20.6	+5 48.3	-0.5549	0.5927	0.0153	-14	-80
63 Ophiuchi	6.6	1.62	1.2	24 52.0	9 29.4	-9 24.8	+0.6985	0.5941	0.0404	+63	0
B. A. C. 6066	7.3	1.62	1.5	23 55.5	10 22.4	-8 34.0	-0.2206	0.5942	0.0429	+6	-54
4 Sagittarii	5.4	+1.61	-1.4	-23 48.4	11 24.9	-7 33.9	-0.2940	0.5942	+0.0457	+3	-59
5 Sagittarii	7.0	1.61	1.2	24 16.6	11 33.7	-7 25.5	+0.1883	0.5943	0.0461	+29	-30
7 Sagittarii	5.9	1.60	1.1	24 16.9	12 35.9	-6 25.8	+0.2429	0.5943	0.0490	+32	-26
Piazzi 17 <sup>b</sup> 330	5.3	1.58	1.5	23 8.4	12 55.3	-6 7.2	-0.8974	0.5943	0.0498	-11	-90
9 Sagittarii	6.0	1.59	1.1	24 21.8	12 59.7	-6 3.0	+0.3452	0.5943	0.0500	+38	-21
Piazzi 17 <sup>b</sup> 334	5.3	+1.57	-1.6	-22 50.4	13 2.7	-6 0.1	-1.1962	0.5943	+0.0502	-55	-90

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## MARCH.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels	
Name.	Mag.	Red'ns from 1893.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
36 Sextantis	6.6	+2.91	-18.0	+ 3 0.9	24 10 57.1	+ 0 26.7	+0.5348	0.5091	-0.2273	+74	-12
55 Leonis	6.2	2.92	18.5	1 16.2	16 36.2	+ 5 56.2	+1.1480	0.5094	0.2289	+90	+27
$\gamma^s$ Leonis	5.4	2.93	18.7	0 32.3	20 50.4	+10 3.2	+0.9732	0.5100	0.2298	+90	+14
$\gamma^s$ Leonis	5.7	2.94	18.9	+ 0 28.5	25 2 15.1	- 8 41.3	-0.2048	0.5109	0.2306	+29	-52
$\epsilon$ Leonis	5.3	2.96	19.4	- 2 27.1	11 2.1	- 0 9.5	+0.9436	0.5128	0.2309	+88	+12
B. A. C. 4006	6.1	+2.98	-19.6	- 4 46.6	21 55.2	+10 24.7	+0.9489	0.5160	-0.2296	+85	+12
$\eta$ Virginis	5.7	3.02	19.5	8 54.0	26 19 51.0	+ 7 41.4	+0.4261	0.5249	0.2207	+63	-17
75 Virginis	6.0	3.07	17.9	14 50.9	28 0 43.0	+11 39.2	+0.7125	0.5408	0.1954	+75	- 1
83 Virginis	6.0	3.08	17.2	15 40.6	6 10.9	- 7 3.5	+0.5373	0.5420	0.1888	+65	-11
85 Virginis	6.5	3.08	17.0	15 15.9	6 41.7	- 6 33.7	+0.0054	0.5446	0.1881	+34	-40
B. A. C. 4722	5.8	+3.08	-15.8	-17 44.0	20 22.3	+ 6 39.5	+0.1654	0.5535	-0.1686	+40	-31
B. A. C. 4923	7.3	3.09	13.5	20 57.7	29 14 51.6	+ 0 29.9	+0.7194	0.5654	0.1362	+69	0
42 Libræ	5.7	3.03	10.0	23 29.6	30 9 1.7	- 5 59.6	+1.2164	0.5761	0.0978	+67	+43
B. A. C. 5254	5.8	2.99	9.2	23 40.8	14 40.4	- 0 33.6	+0.8929	0.5790	0.0848	+66	+13
$\delta$ Scorpii	2.6	2.95	9.2	22 20.2	17 19.6	+ 1 59.5	-0.7157	0.5803	0.0785	-17	-90
19 Scorpii	5.1	+2.92	- 7.5	-23 55.7	31 1 34.1	+ 9 55.1	-0.3679	0.5838	-0.0583	+41	-19
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	2.89	7.4	23 13.0	3 34.9	+11 51.4	+0.4798	0.5846	0.0532	- 6	-72
22 Scorpii	5.5	2.90	6.6	24 53.7	5 25.0	-10 22.8	+1.1590	0.5851	0.0486	+65	+37
15 Ophiuchi	7.3	2.80	6.2	22 59.8	11 26.7	- 4 35.1	-1.0437	0.5872	0.0331	-42	-90
18 Ophiuchi	6.7	2.82	5.4	24 27.9	13 15.5	- 2 50.5	+0.4128	0.5876	0.0283	+41	-17
22 Ophiuchi	6.7	+2.77	- 5.5	-23 20.9	15 19.0	- 0 51.8	-0.7905	0.5882	-0.0229	-26	-90
24 Ophiuchi	5.9	2.76	5.5	22 59.5	16 6.1	- 0 6.6	-1.1741	0.5884	0.0209	-35	-90
B. A. C. 5709	6.3	2.79	4.7	24 56.4	17 19.5	+ 1 3.9	+0.8067	0.5887	0.0177	+65	+ 7
26 Ophiuchi	6.1	2.78	4.7	24 50.2	17 24.1	+ 1 8.4	+0.6992	0.5887	0.0175	+63	0
B. A. C. 5815	7.3	+2.72	- 3.6	-25 11.5	23 52.3	+ 7 21.4	+1.0048	0.5898	-0.0002	+65	+22

## APRIL.

39 Ophiuchi ( <i>S. star</i> )	5.5	+2.71	- 3.8	-24 10.7	1 0 30.5	+ 7 58.2	-0.0349	0.5899	+0.0014	+13	-42
B. A. C. 5831	6.9	2.69	3.9	23 57.8	0 32.9	+ 8 0.5	-0.2559	0.5899	0.0015	- 8	-56
B. A. C. 5846	6.8	+2.69	- 3.4	-24 48.3	1 57.3	+ 9 21.5	+0.6130	0.5901	+0.0052	+54	- 5
$\theta$ Ophiuchi	3.3	2.69	3.3	24 54.0	2 4.6	+ 9 28.5	+0.7109	0.5901	0.0056	+64	+ 1
B. A. C. 5868	7.0	2.66	3.4	24 9.1	3 18.9	+10 39.9	-0.0469	0.5902	0.0089	+13	-43
$\delta$ Ophiuchi	4.4	2.66	3.3	24 5.0	3 49.2	+11 9.0	-0.1128	0.5903	0.0103	+ 9	-47
$\epsilon$ Ophiuchi	5.2	2.63	3.0	23 53.1	5 49.1	-10 55.8	-0.2899	0.5905	0.0156	0	-58
63 Ophiuchi	6.6	+2.54	- 1.3	-24 52.0	15 5.3	- 2 1.5	+0.9729	0.5906	+0.0403	+65	+19
B. A. C. 6066	7.3	2.51	1.5	23 55.5	15 59.1	- 1 9.9	+0.0473	0.5905	0.0426	+21	-37
4 Sagittarii	5.4	2.49	1.3	23 48.4	17 2.5	- 0 8.9	-0.0266	0.5904	0.0454	+17	-42
5 Sagittarii	7.0	2.50	1.1	24 16.6	17 11.4	- 0 0.4	+0.4592	0.5904	0.0458	+45	-14
7 Sagittarii	5.9	2.49	1.0	24 16.9	18 14.6	+ 1 0.3	+0.5143	0.5904	0.0486	+49	-11
Piazzi 17 <sup>b</sup> , 330	5.3	+2.46	- 1.3	-23 8.4	18 34.4	+ 1 19.4	-0.6345	0.5903	+0.0495	-15	-88
9 Sagittarii	6.0	2.48	0.9	24 21.8	18 38.8	+ 1 23.6	+0.6173	0.5903	0.0497	+57	- 5
Piazzi 17 <sup>b</sup> , 334	5.3	2.45	1.4	22 50.4	18 41.8	+ 1 26.5	-0.9357	0.5903	0.0498	-33	-90
B. A. C. 6161	5.7	2.44	- 0.7	23 43.4	21 45.9	+ 4 23.3	+0.1309	0.5900	0.0579	+27	-32
B. A. C. 6304	7.0	2.34	+ 0.7	24 11.0	2 6 18.2	-11 24.6	+1.1875	0.5886	0.0799	+66	+39
24 Sagittarii	5.9	+2.33	+ 0.7	-24 6.4	6 33.8	-11 9.5	+1.1308	0.5885	+0.0806	+66	+33
B. A. C. 6343	6.3	2.29	0.8	23 35.5	8 24.9	- 9 22.8	+0.7586	0.5882	0.0853	+66	+ 4
26 Sagittarii	6.6	2.28	1.1	23 55.6	9 44.6	- 8 6.2	+1.2159	0.5879	0.0886	+66	+43
28 Sagittarii	5.6	2.23	0.9	22 29.9	11 33.6	- 6 21.5	-0.0728	0.5874	0.0931	+19	-44
30 Sagittarii	6.6	2.20	1.0	22 16.7	13 22.0	- 4 37.3	-0.1244	0.5869	0.0976	+17	-47
31 Sagittarii	7.0	+2.19	+ 1.0	-22 2.4	13 53.3	- 4 7.2	-0.3150	0.5868	+0.1006	+ 7	-60
33 Sagittarii	6.0	2.17	0.9	21 29.0	14 38.8	- 3 23.5	-0.8049	0.5866	0.1007	-20	-90
$\nu^1$ Sagittarii	5.0	2.20	1.4	22 52.1	14 41.3	- 3 21.1	+0.6074	0.5866	0.1008	+61	- 6
$\nu^2$ Sagittarii	5.1	2.19	1.5	22 47.8	15 4.0	- 2 59.2	+0.5726	0.5865	0.1018	+58	- 8
B. A. C. 6448	6.4	2.20	1.7	23 18.1	15 25.2	- 2 38.9	+1.1214	0.5864	0.1026	+67	+31
$\epsilon^2$ Sagittarii	3.5	+2.15	+ 1.0	-21 14.3	16 8.7	- 1 57.0	-0.8987	0.5862	+0.1044	-26	-90

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	X	Y	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
27 Tauri	4.0	+1.26	+ 6.5	+23 44.8	16 0 37.0	- 3 29.8	-1.0295	0.5598	+0.0873	-23	-66
28 Tauri	6.2	1.27	6.5	23 49.8	0 37.5	- 3 29.3	-1.1179	0.5598	0.0873	-31	-66
B. A. C. 1189	6.0	1.26	5.8	21 56.4	0 58.7	- 3 8.8	+0.9298	0.5598	0.0865	+90	+29
32 Tauri	6.0	1.30	5.8	22 11.3	4 1.2	- 0 12.7	+0.9183	0.5597	0.0797	+90	+29
33 Tauri	6.3	1.30	6.0	22 53.0	4 5.8	- 0 8.3	+0.1812	0.5597	0.0796	+51	-12
B. A. C. 1238	6.3	+1.33	+ 5.9	+22 55.1	5 47.9	+ 1 30.3	+0.2763	0.5596	+0.0758	+57	- 7
36 Tauri	6.0	1.35	6.1	23 49.8	7 16.9	+ 2 56.1	-0.5891	0.5595	0.0723	+ 7	-57
B. A. C. 1347	7.3	1.47	5.8	24 10.4	15 40.8	+11 2.3	-0.4305	0.5587	0.0535	+16	-44
62 Tauri	6.0	1.47	5.7	24 4.0	15 54.2	+11 15.2	-0.3053	0.5586	0.0530	+23	-37
1 <sup>st</sup> Tauri	6.0	1.48	5.1	22 46.2	17 22.6	-11 19.4	+1.1672	0.5586	0.0497	+90	+51
95 Tauri	6.3	+1.59	+ 5.0	+23 53.9	17 0 22.9	- 4 33.9	+0.2441	0.5575	+0.0338	+55	- 5
B. A. C. 1463	6.3	1.60	4.7	23 26.6	1 29.2	- 3 30.0	+0.7722	0.5574	0.0313	+90	+24
99 Tauri	6.0	1.68	4.7	23 47.5	6 50.4	+ 1 40.0	+0.5319	0.5563	0.0191	+77	+12
1 <sup>st</sup> Tauri	6.0	1.67	4.6	24 53.7	6 58.2	+ 1 47.5	-0.6622	0.5563	0.0189	+ 2	-59
103 Tauri	6.0	1.74	4.1	24 8.0	11 24.6	+ 6 4.7	+0.2266	0.5554	+0.0089	+54	- 3
118 Tauri	5.7	+1.87	+ 3.6	+25 4.2	20 51.3	- 8 48.2	-0.8105	0.5529	-0.0121	- 7	-65
121 Tauri	6.0	1.90	2.9	23 58.4	23 39.5	- 6 5.7	+0.3435	0.5521	0.0183	+62	+ 2
B. A. C. 1801	6.0	1.94	2.2	23 9.5	18 3 13.8	- 2 38.6	+1.1562	0.5509	0.0261	+90	+52
132 Tauri	5.3	1.99	2.4	24 32.1	5 46.8	- 0 10.9	-0.4235	0.5502	0.0316	+16	-42
140 Tauri	7.0	2.04	1.3	22 53.7	11 1.8	+ 4 53.5	+1.1784	0.5484	0.0429	+90	+53
1 Geminorum	5.0	+2.06	+ 1.3	+23 16.2	12 41.6	+ 6 29.9	+0.6936	0.5479	-0.0463	+90	+18
2 Geminorum	7.2	2.08	1.3	23 38.9	13 27.6	+ 7 14.3	+0.2418	0.5476	0.0479	+55	- 6
3 Geminorum	6.3	2.09	1.0	23 7.8	15 16.1	+ 8 59.2	+0.7207	0.5470	0.0518	+90	+19
4 Geminorum	7.4	2.09	0.9	23 0.9	15 37.5	+ 9 19.9	+0.8292	0.5468	0.0525	+90	+26
5 Geminorum	6.7	2.12	1.4	24 26.6	16 4.3	+ 9 45.8	-0.7632	0.5466	0.0534	- 4	-66
6 Geminorum	6.7	+2.11	+ 0.8	+22 55.9	16 27.8	+10 8.5	+0.8755	0.5464	-0.0542	+90	+28
7 Geminorum	3.5	2.14	0.5	22 32.2	17 39.2	+11 17.5	+1.2443	0.5460	0.0567	+90	+60
8 Geminorum	6.5	2.15	0.9	24 0.1	18 17.0	+11 54.1	-0.4032	0.5458	0.0579	+17	-43
9 Geminorum	6.3	2.15	0.8	23 46.5	18 35.5	-11 48.0	+0.1711	0.5457	0.0586	+30	-29
10 Geminorum	7.0	2.15	0.7	23 38.4	19 29.2	-10 56.2	-0.0767	0.5453	0.0604	+36	-24
11 Geminorum	7.3	+2.15	+ 0.6	+23 30.6	19 40.9	-10 44.9	+0.0556	0.5453	-0.0608	+43	-17
12 Geminorum	7.5	2.15	+ 0.5	23 19.0	19 42.7	-10 43.1	+0.2667	0.5453	0.0609	+57	- 6
1 <sup>st</sup> Geminorum	6.0	2.31	- 1.7	21 52.8	10 47.2	+ 3 51.6	+0.7067	0.5393	0.0905	+90	+15
44 Geminorum	6.0	2.40	2.2	22 47.3	17 18.5	+10 10.2	-0.9270	0.5374	0.1026	-15	-67
6 Geminorum	3.5	2.46	3.3	22 10.0	20 0 27.0	- 6 55.0	-1.0203	0.5336	0.1153	-21	-68
56 Geminorum	5.7	+2.45	- 3.9	+20 38.0	1 22.0	- 6 3.7	+0.5708	0.5330	-0.1177	+80	+ 4
61 Geminorum	6.0	2.47	4.2	20 27.5	3 47.4	- 3 41.0	+0.4761	0.5322	0.1211	+71	- 2
63 Geminorum	5.7	2.49	3.8	21 39.0	4 9.5	- 3 19.5	-0.8886	0.5320	0.1217	-11	-68
79 Geminorum	6.3	2.55	5.3	20 33.4	12 42.8	+ 4 57.7	-0.7802	0.5285	0.1357	- 4	-69
8 Geminorum	5.3	2.52	5.9	18 45.3	13 13.9	+ 5 27.8	+1.1459	0.5283	0.1365	+90	+40
85 Geminorum	6.0	+2.60	- 6.0	+20 8.9	17 56.0	+10 1.1	-1.0578	0.5264	-0.1438	-23	-70
B. A. C. 2658	7.2	2.59	6.8	18 31.2	20 28.2	-11 31.3	+0.3768	0.5254	0.1476	+64	-10
1 <sup>st</sup> Cancri	4.8	2.63	7.6	17 57.0	21 2 15.6	- 5 54.4	+0.1301	0.5232	0.1560	+48	-24
B. A. C. 2810	7.0	2.68	8.4	17 30.6	8 37.7	+ 0 16.1	-0.4039	0.5220	0.1648	+18	-55
1 <sup>st</sup> Cancri	6.0	2.67	8.5	17 22.6	9 11.5	+ 0 48.9	-0.3498	0.5206	0.1655	+21	-51
54 Cancri	6.3	+2.74	-10.5	+15 43.3	22 10.0	-10 35.8	-0.7731	0.5164	-0.1816	- 2	-74
1 <sup>st</sup> Cancri	5.7	2.76	10.8	15 42.4	1 23.5	- 7 28.0	-1.3461	0.5154	0.1853	-59	-74
1 <sup>st</sup> Leonis	5.3	2.82	13.5	11 44.6	19 41.9	+10 18.5	-0.5287	0.5111	0.2035	+12	-68
1 <sup>st</sup> Leonis	5.7	2.80	13.8	10 9.4	19 43.3	+10 19.9	+1.2166	0.5111	0.2035	+90	+38
1 <sup>st</sup> Leonis	3.8	2.83	14.4	10 20.9	28 0 36.4	- 8 55.4	+0.0017	0.5103	0.2076	+40	-37
10 Sextantis	6.0	+2.85	-15.2	+ 9 24.4	8 46.1	- 0 59.7	-0.6821	0.5095	-0.2138	+ 3	-80
11 Sextantis	6.0	2.84	15.4	8 47.5	9 40.5	- 0 6.8	-0.1988	0.5091	0.2144	+29	-49
1 <sup>st</sup> Leonis	5.0	2.86	15.5	8 31.5	10 47.9	+ 0 58.7	-0.1460	0.5090	0.2152	+32	-46
16 Sextantis	6.9	2.86	16.2	6 39.7	15 39.3	+ 5 41.8	+0.8491	0.5090	0.2182	+90	+ 7
43 Leonis	6.5	2.90	16.6	7 3.0	23 1.9	-11 8.1	-1.2029	0.5084	0.2223	-32	-83
34 Sextantis	6.7	+2.91	-17.8	+ 4 6.3	24 9 35.4	- 0 52.6	-0.3490	0.5087	-0.2268	+22	-60

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.											
APRIL.											
THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
118 Tauri	5.7	+1.42	+ 2.6	+25 4.2	14 5 24.1	+ 1 32.5	-1.0760	0.5583	-0.0130	-28	-65
121 Tauri	6.0	1.44	2.1	23 58.4	8 9.9	+ 4 12.5	+0.0682	0.5574	0.0192	+44	-13
B. A. C. 1801	6.0	1.48	1.6	23 9.5	11 41.3	+ 7 36.6	+0.8728	0.5561	0.0270	+90	+31
132 Tauri	5.3	1.52	1.8	24 32.0	14 12.3	+10 2.4	-0.6988	0.5551	0.0325	0	-63
140 Tauri	7.0	1.57	0.9	22 53.7	19 23.3	- 8 57.2	+0.8897	0.5530	0.0437	+90	+30
1 Geminorum	5.0	+1.59	+ 0.9	+23 16.1	21 1.8	- 7 22.1	+0.4068	0.5526	-0.0472	+67	+ 3
2 Geminorum	7.2	1.60	0.9	23 38.9	21 47.3	- 6 38.2	-0.0429	0.5520	0.0488	+37	-21
3 Geminorum	6.3	1.62	0.6	23 7.8	23 34.4	- 4 54.7	+0.4324	0.5513	0.0525	+68	+ 3
4 Geminorum	7.4	1.62	0.6	23 0.9	23 55.6	- 4 34.3	+0.5399	0.5511	0.0533	+78	+ 9
5 Geminorum	6.7	1.64	1.0	24 26.5	15 0 22.1	- 4 8.5	-1.0435	0.5509	0.0542	-25	-66
6 Geminorum	6.7	+1.63	+ 0.5	+22 55.9	0 45.3	- 3 46.2	+0.5855	0.5507	-0.0550	+82	+11
7 Geminorum	3.5	1.65	0.2	22 32.2	1 56.0	- 2 37.9	+0.9515	0.5502	0.0575	+90	+33
8 Geminorum	6.5	1.66	0.6	24 0.1	2 33.4	- 2 1.7	-0.6870	0.5500	0.0587	0	-64
9 Geminorum	6.3	1.66	0.6	23 46.5	2 51.7	- 1 44.0	-0.4564	0.5500	0.0594	+14	-47
10 Geminorum	7.0	1.67	0.4	23 38.4	3 44.7	- 0 52.9	-0.3628	0.5494	0.0612	+19	-41
11 Geminorum	7.3	+1.67	+ 0.4	+23 30.6	3 56.3	- 0 41.7	-0.2314	0.5493	-0.0616	+27	-33
12 Geminorum	7.5	1.67	+ 0.3	23 19.0	3 58.1	- 0 39.8	-0.0216	0.5493	0.0617	+39	-21
$\mu$ Geminorum	3.2	1.68	- 0.1	22 33.9	5 37.3	+ 0 55.9	+0.6948	0.5485	0.0650	+90	+17
$\delta$ Geminorum	6.0	1.82	1.6	21 52.8	18 54.0	-10 13.8	+0.4106	0.5421	0.0911	+66	- 2
44 Geminorum	6.0	1.91	1.9	22 47.3	16 1 22.5	- 3 58.0	-1.2176	0.5390	0.1030	-42	-67
56 Geminorum	5.7	+1.97	- 3.5	+20 38.0	9 23.1	+ 3 47.1	+0.2729	0.5348	-0.1171	+56	-12
61 Geminorum	6.0	1.98	3.7	20 27.5	11 47.7	+ 6 7.1	+0.1791	0.5338	0.1211	+51	-17
63 Geminorum	5.7	2.01	3.3	21 39.0	12 9.7	+ 6 28.5	-1.1808	0.5336	0.1217	-36	-68
79 Geminorum	6.3	2.09	4.6	20 33.5	20 41.1	- 9 16.2	-1.0726	0.5294	0.1355	-25	-69
8 Geminorum	5.3	2.06	5.3	18 45.3	21 12.1	- 8 46.2	+0.8480	0.5291	0.1363	+90	+17
B. A. C. 2658	7.2	+2.13	- 6.0	+18 31.3	17 4 25.4	- 1 46.4	+0.0834	0.5257	-0.1471	+45	-25
3 Cancri	6.0	2.11	6.4	17 35.0	4 29.5	- 1 42.4	+1.1095	0.5257	0.1472	+90	+35
$\zeta$ Cancri	4.8	2.18	6.5	17 57.0	10 12.6	+ 3 50.3	-0.1608	0.5233	0.1554	+31	-39
B. A. C. 2810	7.0	2.24	6.8	17 30.6	16 34.6	+10 0.7	-0.6905	0.5205	0.1639	+ 2	-72
$\delta$ Cancri	6.0	2.24	7.5	17 22.6	17 8.4	+10 33.5	-0.6361	0.5202	0.1646	+ 5	-70
54 Cancri	6.3	+2.33	- 7.6	+15 43.3	18 6 8.2	- 0 49.8	-1.0484	0.5153	-0.1802	-21	-74
$\xi$ Leonis	5.3	2.47	12.5	11 44.6	19 3 44.5	- 3 51.1	-0.7834	0.5093	0.2014	- 3	-78
$\delta$ Leonis	5.7	2.44	13.0	10 9.5	3 45.9	- 3 49.7	+0.9619	0.5093	0.2014	+90	+17
$\theta$ Leonis	3.8	2.49	13.5	10 20.9	8 40.4	+ 0 56.3	-0.2470	0.5084	0.2054	-27	-51
10 Sextantis	6.0	2.56	14.3	9 24.5	16 52.1	+ 8 53.9	-0.9183	0.5074	0.2113	-11	-81
11 Sextantis	6.0	+2.56	-14.6	+ 8 47.5	17 46.8	+ 9 47.2	-0.4338	0.5072	-0.2116	+17	-64
$\pi$ Leonis	5.0	2.56	14.7	8 31.5	18 54.4	+10 52.9	-0.3788	0.5072	0.2127	+20	-60
16 Sextantis	6.9	2.58	15.6	6 39.7	23 47.1	- 8 22.7	+0.6242	0.5068	0.2157	+82	- 6
34 Sextantis	6.7	2.72	17.4	4 6.3	20 17 47.1	+ 9 6.9	-0.5407	0.5072	0.2242	+11	-73
36 Sextantis	6.6	2.72	17.7	3 0.9	19 9.1	+10 26.5	+0.3452	0.5074	0.2246	+60	-21
55 Leonis	6.2	+2.73	-18.4	+ 1 16.2	21 0 49.0	- 8 3.2	+0.9697	0.5082	-0.2263	+90	+14
57 Leonis	6.9	2.73	18.4	0 58.0	0 59.3	- 7 53.3	+1.2618	0.5082	0.2263	+90	+38
$\rho^a$ Leonis	5.4	2.76	18.7	0 32.3	5 3.7	- 3 55.7	-0.8036	0.5089	0.2272	+90	+ 3
$\rho^b$ Leonis	5.7	2.81	18.9	+ 0 28.5	10 23.3	+ 1 14.6	-0.3410	0.5101	0.2280	+22	-60
$\epsilon$ Leonis	5.3	2.86	19.7	- 2 27.1	19 15.6	+ 9 51.8	+0.8054	0.5125	0.2285	+88	+ 3
B. A. C. 4006	6.1	+2.93	-20.3	- 4 46.7	22 6 7.3	- 3 35.5	+0.8361	0.5164	-0.2273	+85	+ 5
$\eta$ Virginis	5.7	3.08	20.7	8 54.1	23 3 55.9	- 6 26.0	+0.3677	0.5269	0.2191	+59	-20
75 Virginis	6.0	3.29	19.9	14 50.9	24 8 28.2	- 2 47.9	+0.7224	0.5451	0.1946	+75	0
83 Virginis	6.0	3.33	19.3	15 40.6	13 51.2	+ 2 24.5	+0.5611	0.5491	0.1880	+67	- 9
85 Virginis	6.5	3.33	19.2	15 15.9	14 21.5	+ 2 53.8	+0.0342	0.5563	0.1874	+35	-38
B. A. C. 4722	5.8	+3.42	-17.9	-17 44.1	25 3 48.3	- 8 6.9	+0.2238	0.5594	-0.1681	+43	-27
B. A. C. 4923	7.3	3.56	15.9	20 57.7	21 56.2	+ 9 22.2	+0.8119	0.5724	0.1357	+69	+ 6
B. A. C. 5254	5.8	3.61	11.1	23 40.8	26 21 15.3	+ 7 48.8	+1.0276	0.5865	0.0840	+66	+23
$\delta$ Scorpii	2.6	3.57	10.7	22 20.2	23 51.1	+10 18.5	-0.5617	0.5879	0.0776	- 8	-79
19 Scorpii	5.1	3.59	8.9	23 55.7	27 7 55.5	- 5 55.9	+0.5253	0.5913	0.0573	+51	-10
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	+3.57	- 8.7	-23 13.0	9 53.9	- 4 2.1	-0.3118	0.5920	-0.0522	+ 3	-59

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	$d\ h\ m$	$h\ m$				$\alpha$	$\delta$
15 Ophiuchi	7.3	+3.53	-7.1	-22 59.9	27 17 36.5	+ 3 22.2	-0.8596	0.5944	-0.0319	-30	-90
18 Ophiuchi	6.7	3.55	6.4	24 27.9	19 23.1	+ 5 4.6	+0.5874	0.5948	0.0271	+53	- 6
22 Ophiuchi	6.7	3.52	6.3	23 20.9	21 24.3	+ 7 1.0	-0.6024	0.5952	0.0217	-16	-84
24 Ophiuchi	5.9	3.51	6.2	22 59.5	22 10.5	+ 7 45.3	-0.9823	0.5952	0.0197	-39	-90
B. A. C. 5709	6.3	3.55	5.5	24 56.4	23 22.6	+ 8 54.5	+0.9839	0.5956	0.0164	+65	+20
26 Ophiuchi	6.1	+3.55	-5.5	-24 50.2	23 27.1	+ 8 58.9	+0.8773	0.5956	-0.0162	+65	+12
B. A. C. 5815	7.3	3.51	4.1	25 11.5	28 5 48.5	- 8 54.9	+1.1894	0.5964	+0.0011	+65	+41
39 Ophiuchi ( <i>S. star</i> )	5.5	3.48	4.3	24 10.7	6 26.1	- 8 18.8	+0.1584	0.5964	0.0027	+23	-31
B. A. C. 5831	6.9	3.47	4.3	23 57.8	6 28.5	- 8 16.6	-0.0609	0.5964	0.0028	+11	-43
B. A. C. 5846	6.8	3.48	3.8	24 48.3	7 51.4	- 6 57.0	+0.8033	0.5965	0.0066	+65	+ 7
$\theta$ Ophiuchi	3.3	+3.49	-3.8	-24 54.0	7 58.6	- 6 50.1	+0.9007	0.5965	+0.0069	+65	+14
B. A. C. 5868	7.0	3.46	3.8	24 9.1	9 11.7	- 5 39.9	+0.1497	0.5965	0.0102	+24	-31
$\delta$ Ophiuchi	4.4	3.46	3.6	24 5.0	9 41.4	- 5 11.4	+0.0850	0.5966	0.0116	+20	-35
$\epsilon$ Ophiuchi	5.2	3.43	3.2	23 53.1	11 39.5	- 3 18.1	-0.0884	0.5966	0.0170	+11	-45
63 Ophiuchi	6.6	3.38	1.0	24 52.0	20 47.5	+ 5 28.0	+1.1769	0.5959	0.0417	+65	+40
B. A. C. 6066	7.3	+3.34	-1.1	-23 55.5	21 40.6	+ 6 19.0	+0.2578	0.5958	+0.0441	+33	-25
4 Sagittarii	5.4	3.33	0.9	23 48.4	22 43.2	+ 7 19.1	+0.1863	0.5956	0.0469	+29	-29
5 Sagittarii	7.0	3.34	0.7	24 16.6	22 52.1	+ 7 27.7	+0.6716	0.5956	0.0472	+62	- 1
7 Sagittarii	5.9	3.33	0.5	24 16.9	23 54.4	+ 8 27.4	+0.7245	0.5954	0.0500	+66	+ 2
Piazzi 17 <sup>b</sup> , 330	5.3	3.30	0.8	23 8.4	20 13.9	+ 8 46.1	-0.4176	0.5953	0.0509	- 3	-67
9 Sagittarii	6.0	+3.33	-0.4	-24 21.8	0 18.3	+ 8 50.4	+0.8275	0.5953	+0.0509	+66	+ 9
Piazzi 17 <sup>b</sup> , 334	5.3	3.29	-0.8	22 50.4	0 21.3	+ 8 53.3	-0.7168	0.5953	0.0509	-20	-90
B. A. C. 6161	5.7	3.28	0.0	23 43.3	3 23.2	+11 47.9	+0.3468	0.5947	0.0593	+38	-20
B. A. C. 6336	6.2	3.11	+1.5	21 28.9	13 43.8	- 2 16.1	-1.1768	0.5918	0.0860	-49	-90
B. A. C. 6343	6.3	3.16	2.1	23 35.4	13 55.9	- 2 4.5	+0.9818	0.5917	0.0865	+66	+19
28 Sagittarii	5.6	+3.10	+2.4	-22 29.9	17 3.2	+ 0 55.4	+0.1561	0.5905	+0.0943	+32	-31
30 Sagittarii	6.6	3.07	2.6	22 16.6	18 50.8	+ 2 38.8	+0.1058	0.5899	0.0987	+29	-34
31 Sagittarii	7.0	3.06	2.6	22 2.4	19 21.9	+ 3 8.7	-0.0824	0.5897	0.1000	+19	-45
33 Sagittarii	6.0	3.03	2.6	21 28.9	20 7.1	+ 3 52.1	-0.5704	0.5894	0.1018	- 6	-80
$\nu$ Sagittarii	5.0	3.07	3.1	22 52.1	20 9.7	+ 3 54.6	+0.8365	0.5893	0.1019	+67	+10
$\nu^a$ Sagittarii	5.1	+3.06	+3.1	-22 47.8	20 32.2	+ 4 16.3	+0.8021	0.5892	+0.1028	+67	+ 7
$\zeta$ Sagittarii	5.7	3.00	2.6	20 47.3	21 27.8	+ 5 9.7	-1.1348	0.5888	0.1050	-44	-90
$\zeta^a$ Sagittarii	3.5	3.01	2.8	21 14.3	21 36.6	+ 5 18.1	-0.6628	0.5888	0.1054	-11	-90
$\sigma$ Sagittarii	3.8	2.99	3.5	21 53.3	30 0 22.7	+ 7 57.9	+0.2949	0.5873	0.1120	+41	-23
$\pi$ Sagittarii	3.1	2.95	3.6	21 11.0	2 26.1	+ 9 56.4	-0.1842	0.5865	0.1168	+16	-51
B. A. C. 6707	5.9	+2.76	+4.8	-19 4.5	13 17.5	- 3 37.1	-0.9175	0.5813	+0.1410	-23	-90
f Sagittarii	5.2	2.73	5.7	20 0.1	17 21.9	+ 0 18.0	+0.6136	0.5788	0.1494	+65	- 6
57 Sagittarii	6.1	+2.68	+5.7	-19 18.0	19 47.1	+ 2 37.8	+0.2704	0.5779	+0.1543	+44	-25

MAY.

$\tau_1$ Capricorni	7.0	+2.35	+7.0	-15 29.7	1 14 53.4	- 2 58.3	-0.2901	0.5677	+0.1883	+17	-57
$\tau_2$ Capricorni	5.6	2.33	7.1	15 18.4	15 43.2	- 2 10.2	-0.3235	0.5669	0.1805	+16	-59
8 Aquarii	6.8	2.19	7.4	13 26.6	2 0 42.3	+ 6 29.6	-0.4479	0.5622	0.2025	+11	-68
9 Aquarii	6.8	2.19	7.6	13 55.4	1 14.1	+ 7 0.3	+0.1417	0.5618	0.2032	+42	-32
B. A. C. 7562	5.5	+1.90	+7.8	- 9 29.9	20 47.3	+ 1 52.8	-0.1422	0.5529	+0.2247	+30	-48
$\epsilon$ Capricorni	5.5	1.90	7.8	9 32.7	20 49.5	+ 1 54.9	-0.0879	0.5529	0.2247	+32	-44
$\epsilon^a$ Capricorni	6.4	1.89	7.9	9 44.4	21 23.8	+ 2 28.0	+0.2393	0.5527	0.2252	+51	-27
30 Aquarii	5.8	1.78	7.7	7 0.5	3 5 9.8	+ 9 58.1	-0.7577	0.5498	0.2313	- 2	-90
B. A. C. 7704	7.3	1.75	7.5	6 19.2	7 11.7	+11 56.0	-0.9851	0.5491	0.2326	-16	-90
B. A. C. 7717	6.9	+1.75	+8.1	- 8 1.2	8 0.4	-11 17.0	+0.9299	0.5489	+0.2331	+82	+11
44 Aquarii	6.4	1.70	7.7	5 53.3	11 31.7	- 7 52.7	-0.4093	0.5478	0.2352	+17	-64
51 Aquarii	5.8	1.66	7.6	5 20.8	14 46.1	- 4 44.9	-0.1960	0.5469	0.2309	+29	-51
$\kappa$ Aquarii	5.2	1.58	7.7	4 44.8	21 6.3	+ 1 22.8	+0.7046	0.5454	0.2394	+86	- 2
3 Piscium	6.4	1.45	6.9	- 0 21.3	4 7 48.2	+11 43.6	-1.1900	0.5436	0.2418	-31	-90
$\kappa$ Piscium	4.7	+1.33	+7.1	+ 0 42.3	20 9.0	- 0 20.0	+0.7165	0.5428	+0.2414	+90	- 2



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z	y	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	d h m	h m					
9 Piscium	6.6	+1.33	+7.1	+ 0 34.2	4 20 17.9	- 0 11.4	+0.8898	0.5428	+0.2414	+90	+ 9
16 Piscium	5.8	1.27	7.0	1 32.6	5 0 36.4	+ 3 58.7	+0.9342	0.5428	0.2405	+90	+13
19 Piscium	4.9	1.23	6.8	2 55.7	5 18.4	+ 8 31.5	+0.6465	0.5429	0.2391	+84	- 5
36 Piscium	6.3	1.11	5.9	7 40.9	19 27.2	- 1 47.6	-0.8875	0.5445	0.2320	- 9	-82
d Piscium	5.3	1.10	6.0	7 37.9	21 20.1	+ 0 1.6	-0.4011	0.5448	0.2307	+19	-62
45 Piscium	6.9	+1.09	+6.1	+ 7 8.1	23 42.8	+ 2 19.6	+0.6559	0.5452	+0.2290	+85	- 3
75 Piscium	6.0	0.98	5.2	12 25.0	6 18 37.1	- 3 23.7	-0.6129	0.5495	0.2114	+ 7	-73
7 Piscium	3.7	0.94	4.9	14 49.6	7 5 59.0	+ 7 35.2	-0.7870	0.5528	0.1973	- 4	-75
101 Piscium	6.3	0.92	5.0	14 8.8	7 56.2	+ 9 28.4	+0.3015	0.5534	0.1946	+57	-18
104 Piscium	7.5	0.92	5.0	13 46.5	9 30.7	+10 59.8	+0.9931	0.5539	0.1924	+90	+22
105 Piscium	6.3	+0.92	+4.7	+15 53.7	9 41.2	+11 9.9	-1.1761	0.5539	+0.1922	-32	-74
4 Arietis	5.7	0.91	4.7	16 27.2	13 31.2	- 9 8.0	-1.0332	0.5551	0.1866	-20	-74
4 Arietis	5.7	+0.90	+4.5	+17 19.5	17 38.1	- 5 9.5	-1.1875	0.5565	+0.1803	-34	-73
NEW MOON.											
B. A. C. 1347	7.3	+1.02	+2.9	+24 10.3	10 9 23.6	+ 8 20.8	-0.7794	0.5673	+0.0514	- 6	-66
62 Tauri	6.0	1.02	2.9	24 4.0	9 36.8	+ 8 33.6	-0.6556	0.5673	0.0509	+ 2	-61
v Tauri	4.7	1.02	2.7	22 35.1	10 38.0	+ 9 32.5	+0.9798	0.5672	0.0485	+90	+35
v Tauri	6.0	1.03	2.7	22 46.2	11 3.5	+ 9 57.2	+0.8034	0.5671	0.0475	+90	+25
r Tauri	4.5	1.06	2.4	22 45.8	17 31.8	- 7 48.4	+1.0713	0.5665	0.0326	+90	+45
95 Tauri	6.3	+1.07	+2.5	+23 53.9	17 55.7	- 7 25.4	-0.1334	0.5665	+0.0317	+32	-25
B. A. C. 1463	6.3	1.07	2.4	23 26.6	19 0.6	- 6 22.8	+0.3879	0.5663	0.0292	+65	+ 1
99 Tauri	6.0	1.11	2.3	23 47.5	11 0 15.3	- 1 19.3	+0.1353	0.5654	0.0170	+48	- 9
k Tauri	6.0	1.11	2.1	24 53.7	0 23.0	- 1 11.8	-1.0504	0.5654	0.0167	-26	-66
103 Tauri	6.0	1.14	1.9	24 7.9	4 44.0	+ 2 59.9	-0.1790	0.5644	+0.0067	+29	-25
118 Tauri	5.7	+1.21	+1.5	+25 4.1	13 58.9	+11 55.2	-1.2299	0.5618	-0.0144	-48	-65
121 Tauri	6.0	1.22	1.2	23 58.4	16 43.5	- 9 26.0	-0.0911	0.5609	0.0206	+35	-21
B. A. C. 1801	6.0	1.24	0.7	23 9.4	20 13.3	- 6 3.5	+0.7063	0.5596	0.0284	+90	+21
132 Tauri	5.3	1.27	0.9	24 32.0	22 43.4	- 3 38.6	-0.8636	0.5587	0.0339	-12	-65
140 Tauri	7.0	1.30	0.2	22 53.6	12 3 52.2	+ 1 19.5	+0.7145	0.5567	0.0451	+90	+20
141 Tauri	6.7	+1.30	0.0	+22 23.9	4 25.7	+ 1 51.8	+1.2291	0.5564	-0.0463	+90	+59
1 Geminorum	5.0	1.31	+0.1	23 16.1	5 30.0	+ 2 53.9	+0.2305	0.5560	0.0486	+54	- 7
2 Geminorum	7.2	1.32	+0.1	23 38.9	6 15.1	+ 3 37.4	-0.2192	0.5556	0.0502	+27	-31
3 Geminorum	6.3	1.33	-0.1	23 7.8	8 1.7	+ 5 20.4	+0.2527	0.5548	0.0540	+55	- 6
4 Geminorum	7.4	1.34	-0.1	23 0.8	8 22.6	+ 5 40.6	+0.3598	0.5546	0.0547	+63	- 1
5 Geminorum	6.7	+1.35	+0.2	+24 26.5	8 48.8	+ 6 5.9	-1.2208	0.5545	-0.0556	-45	-66
6 Geminorum	6.7	1.34	-0.2	22 55.9	9 11.9	+ 6 28.2	+0.4043	0.5543	0.0564	+66	+ 1
7 Geminorum	3.5	1.36	0.3	22 32.2	10 22.1	+ 7 36.0	+0.7682	0.5538	0.0588	+90	+22
8 Geminorum	6.5	1.37	0.1	24 0.1	10 59.1	+ 8 11.8	-0.8675	0.5535	0.0601	-11	-66
9 Geminorum	6.3	1.37	0.1	23 46.5	11 17.3	+ 8 29.4	-0.6378	0.5533	0.0608	+ 3	-61
10 Geminorum	7.0	+1.37	-0.3	+23 38.4	12 10.0	+ 9 20.2	-0.5455	0.5530	-0.0626	+ 9	-53
11 Geminorum	7.3	1.37	0.3	23 30.6	12 21.5	+ 9 31.3	-0.4146	0.5529	0.0630	+16	-44
12 Geminorum	7.5	1.37	0.3	23 18.9	12 23.3	+ 9 33.1	-0.2051	0.5528	0.0631	+28	-32
$\mu$ Geminorum	3.2	1.38	0.6	22 33.9	14 1.7	+11 8.1	+0.5079	0.5520	0.0664	+74	+ 6
d Geminorum	6.0	1.51	1.8	21 52.8	18 3 12.8	- 0 7.3	+0.2104	0.5454	0.0924	+53	-12
$\zeta$ Geminorum	4.0	+1.53	-2.6	+20 43.1	9 7.4	+ 5 35.7	+0.9077	0.5422	-0.1033	+90	+26
56 Geminorum	5.7	1.61	3.4	20 38.0	17 36.5	-10 11.6	+0.0606	0.5375	0.1182	+43	-23
61 Geminorum	6.0	1.64	3.6	20 27.5	20 0.4	- 7 52.4	-0.0350	0.5363	0.1222	+38	-28
79 Geminorum	6.3	1.70	4.3	20 33.5	14 4 51.4	+ 0 41.9	-1.2913	0.5315	0.1365	-53	-69
g Geminorum	5.3	1.69	4.9	18 45.3	5 22.3	+ 1 11.8	+0.6265	0.5312	0.1372	+85	+ 5
B. A. C. 2658	7.2	+1.75	-5.5	+18 31.3	12 34.0	+ 8 10.1	-0.1411	0.5274	-0.1479	+31	-37
3 Cancri	6.0	1.74	5.8	17 35.0	12 38.1	+ 8 14.1	+0.8839	0.5273	0.1480	+90	+20
Cancri	4.8	1.80	6.1	17 57.0	18 20.4	-10 14.1	-0.3879	0.5244	0.1560	+19	-53
B. A. C. 2810	7.0	1.85	6.8	17 30.6	15 0 41.9	- 4 4.2	-0.9203	0.5213	0.1643	-13	-72
d Cancri	6.0	1.85	6.8	17 22.6	1 15.7	- 3 31.4	-0.8660	0.5210	0.1650	- 9	-73
54 Cancri	6.3	+1.96	-8.5	+15 43.4	14 15.8	+ 9 5.5	-1.2820	0.5153	-0.1801	-45	-74

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.	
		Δα	Δδ									
ξ Leonis	5.3	+2.12	-11.3	+11 44.6	16 11 56.6	+ 6 8.9	-1.0165	0.5079	-0.2005	-18	-78	
λ Leonis	5.7	2.10	11.8	10 9.5	11 58.0	+ 6 10.3	+0.7320	0.5079	0.2005	+90	+ 3	
ο Leonis	3.8	2.14	12.2	10 20.9	16 54.1	+10 57.9	-0.4774	0.5067	0.2043	+14	-66	
10 Sextantis	6.0	2.21	13.0	9 24.5	17 1 9.3	- 5 0.9	-1.1478	0.5052	0.2099	-28	-81	
11 Sextantis	6.0	2.21	13.3	8 47.5	2 4.3	- 4 7.5	-0.6613	0.5050	0.2105	+ 4	-80	
π Leonis	5.0	+2.22	-13.4	+ 8 31.5	3 12.4	- 3 1.3	-0.6056	0.5049	-0.2112	+ 8	-76	
14 Sextantis	6.6	2.23	14.5	6 6.0	6 47.8	+ 0 28.1	+1.3057	0.5044	0.2133	+90	+45	
16 Sextantis	6.9	2.25	14.2	6 39.7	8 7.4	+ 1 45.4	+0.4029	0.5043	0.2140	+64	-17	
34 Sextantis	6.7	2.39	16.1	4 6.4	18 2 17.4	- 4 34.9	-0.7521	0.5041	0.2219	0	-81	
36 Sextantis	6.6	2.40	16.5	3 0.9	3 40.2	- 3 14.5	+0.1380	0.5041	0.2223	+48	-32	
55 Leonis	6.2	+2.45	-17.3	+ 1 16.2	9 23.5	+ 2 19.2	+0.7705	0.5048	-0.2238	+90	+ 2	
57 Leonis	6.9	2.45	17.4	0 58.0	9 39.4	+ 2 34.7	+1.0433	0.5048	0.2239	+90	+19	
ρ <sup>1</sup> Leonis	5.4	2.48	17.6	+ 0 32.3	13 40.9	+ 6 29.4	+0.6080	0.5054	0.2246	+80	- 8	
ρ <sup>2</sup> Leonis	6.9	2.51	18.3	- 0 47.5	16 43.3	+ 9 26.6	+1.3738	0.5060	0.2251	+89	+65	
ρ <sup>3</sup> Leonis	5.7	2.54	17.8	+ 0 28.5	19 9.2	+11 48.4	-0.5545	0.5065	0.2254	+10	-75	
ε Leonis	5.3	+2.61	-18.9	- 2 27.1	19 4 1.6	- 3 34.3	+0.6271	0.5089	-0.2257	+81	- 7	
B. A. C. 4006	6.1	2.73	19.6	4 46.6	14 59.9	+ 7 5.1	+0.6720	0.5129	0.2245	+84	- 4	
14 Virginis	6.9	2.88	20.5	8 21.6	20 5 39.6	- 2 41.1	+1.2584	0.5200	0.2200	+82	+38	
γ Virginis	5.7	2.96	20.5	8 54.1	12 59.2	+ 4 25.2	+0.2359	0.5242	0.2164	+51	-27	
75 Virginis	6.0	3.30	20.3	14 51.0	21 17 37.6	+ 8 9.5	+0.6383	0.5443	0.1926	+73	- 5	
83 Virginis	6.0	+3.37	-20.0	-15 40.6	23 0.4	-10 38.3	+0.4869	0.5488	-0.1863	+62	-13	
85 Virginis	6.5	3.37	19.9	15 15.9	-23 30.7	-10 9.0	-0.0384	0.5492	0.1856	+31	-42	
B. A. C. 4722	5.8	3.54	18.8	17 44.1	22 12 54.7	+ 2 47.4	+0.1745	0.5603	0.1667	+40	-30	
B. A. C. 4923	7.3	3.80	17.2	20 57.8	23 6 53.8	- 3 52.3	+0.7902	0.5753	0.1347	+69	+ 5	
B. A. C. 5254	5.8	4.00	12.2	23 40.8	24 5 52.9	- 5 45.7	+1.0404	0.5919	0.0832	+66	+25	
δ Scorpii	2.6	+3.98	-11.6	-22 20.3	8 26.0	- 3 18.7	-0.5319	0.5935	-0.0770	- 7	-76	
19 Scorpii	5.1	4.05	9.8	23 55.8	16 21.1	+ 4 17.5	+0.5580	0.5977	0.0563	+53	- 8	
ρ Ophiuchi (S.star)	5.0	4.04	9.4	23 13.0	18 17.1	+ 6 8.9	-0.2681	0.5985	0.0513	+ 5	-56	
15 Ophiuchi	7.3	4.06	7.5	22 59.9	25 1 49.9	-10 36.6	-0.7986	0.6016	0.0308	-26	-90	
18 Ophiuchi	6.7	4.09	7.0	24 27.9	3 34.2	- 8 56.5	+0.6355	0.6022	0.0260	+57	- 3	
22 Ophiuchi	6.7	+4.06	- 6.6	-23 20.9	5 32.6	- 7 2.9	-0.5387	0.6027	-0.0205	-12	-78	
24 Ophiuchi	5.9	4.05	6.4	22 59.5	6 17.7	- 6 19.7	-0.9137	0.6029	0.0186	-35	-90	
B. A. C. 5709	6.3	4.11	6.1	24 56.4	7 28.2	- 5 12.1	+1.0331	0.6033	0.0152	+65	+25	
26 Ophiuchi	6.1	4.11	6.1	24 50.2	7 32.6	- 5 7.9	+0.9278	0.6033	-0.0150	+65	+16	
B. A. C. 5815	7.3	4.12	4.4	25 11.5	13 44.9	+ 0 49.3	+1.2447	0.6044	+0.0024	+65	+51	
39 Ophiuchi (S.star)	5.5	+4.09	- 4.4	-24 10.7	14 21.7	+ 1 24.6	+0.2262	0.6045	+0.0042	+27	-27	
B. A. C. 5831	6.9	4.08	4.4	23 57.8	14 23.9	+ 1 26.7	+0.0094	0.6045	0.0043	+15	-39	
B. A. C. 5846	6.8	4.10	4.0	24 48.3	15 44.9	+ 2 44.3	+0.8655	0.6047	0.0079	+65	+12	
θ Ophiuchi	3.3	4.11	3.9	24 54.0	15 51.9	+ 2 51.0	+0.9620	0.6047	0.0084	+65	+19	
B. A. C. 5868	7.0	4.12	3.6	24 9.1	17 3 3	+ 3 59.5	+0.2212	0.6047	0.0118	+28	-27	
δ Ophiuchi	4.4	+4.08	- 3.6	-24 5.0	17 32.2	+ 4 27.2	+0.1580	0.6049	+0.0131	+24	-31	
α Ophiuchi	5.2	4.07	3.1	23 53.1	19 27.4	+ 6 17.6	-0.0108	0.6050	0.0185	+16	-40	
B. A. C. 6066	7.3	4.03	0.5	23 55.5	26 5 13.3	- 8 20.6	+0.3439	0.6047	0.0460	+38	-20	
4 Sagittarii	5.4	4.02	0.4	23 48.4	6 14.3	- 7 22.1	+0.2736	0.6044	0.0488	+34	-24	
5 Sagittarii	7.0	4.04	0.2	24 16.6	6 22.9	- 7 13.9	+0.7513	0.6044	0.0492	+66	+ 4	
7 Sagittarii	5.9	+4.03	0.0	-24 16.9	7 23.6	- 6 15.7	+0.8076	0.6042	+0.0520	+66	+ 7	
Piazzi 17 <sup>b</sup> , 330	5.3	4.00	- 0.1	23 8.4	7 42.6	- 5 57.4	-0.3202	0.6041	0.0529	+ 2	-60	
9 Sagittarii	6.0	4.03	+ 0.1	24 21.8	7 46.9	- 5 53.3	+0.9098	0.6041	0.0531	+66	+15	
Piazzi 17 <sup>b</sup> , 334	5.3	4.01	0.0	22 50.4	7 49.8	- 5 50.5	-0.6157	0.6041	0.0532	-14	-86	
B. A. C. 6161	5.7	3.99	0.8	23 43.3	10 47.0	- 3 0.6	+0.4386	0.6036	0.0613	+45	-15	
B. A. C. 6336	6.2	+3.86	+ 2.9	-21 28.8	20 51.5	+ 6 39.2	-1.0516	0.6006	+0.0883	-38	-90	
B. A. C. 6343	6.3	3.92	3.4	23 35.4	21 3.2	+ 6 50.5	+1.0779	0.6005	0.0888	+66	+28	
28 Sagittarii	5.6	3.86	3.9	22 29.8	27 0 5.7	+ 9 45.5	+0.2656	0.5994	0.0967	+38	-25	
30 Sagittarii	6.6	3.84	4.3	22 16.6	1 50.5	+11 26.1	+0.2178	0.5986	0.1012	+36	-27	
31 Sagittarii	7.0	3.83	4.3	22 2.3	2 20.8	+11 55.2	+0.0310	0.5984	0.1024	+25	-38	
33 Sagittarii	6.0	+3.81	+ 4.3	-21 28.9	3 4.9	-11 22.5	-0.4502	0.5981	+0.1043	0	-69	

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1890.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\nu^1$ Sagittarii	5.0	+3.85	+ 4.6	-22 52.1	27 3 7.3	-11 20.2	+0.9410	0.5981	+0.1044	+67	+16
$\nu^2$ Sagittarii	5.1	3.84	4.7	22 47.8	3 29.3	-10 59.0	+0.9076	0.5978	0.1053	+67	+14
$\xi^1$ Sagittarii	5.7	3.78	4.5	20 47.2	4 23.5	-10 7.0	-1.0066	0.5975	0.1076	-33	-90
$\xi^2$ Sagittarii	3.5	3.79	4.6	21 14.3	4 32.0	-9 58.9	-0.5403	0.5974	0.1082	- 4	-77
$\sigma$ Sagittarii	3.8	3.79	5.2	21 53.3	7 14.0	- 7 23.3	+0.4105	0.5962	0.1146	-17	-48
$\pi$ Sagittarii	3.1	+3.75	+ 5.7	-21 11.0	9 14.2	- 5 28.0	-0.0609	0.5952	+0.1194	+22	-43
B. A. C. 6707	5.9	3.58	7.5	19 4.4	19 49.7	+ 4 42.6	-0.7759	0.5893	0.1437	-14	-90
$\zeta$ Sagittarii	5.2	3.56	8.5	20 0.1	23 48.3	+ 8 31.8	+0.7414	0.5869	0.1521	+69	+ 2
57 Sagittarii	6.1	3.51	8.7	19 18.0	28 2 10.1	+10 48.3	+0.4037	0.5854	0.1570	+52	-18
$\gamma_1$ Capricorni	7.0	3.20	10.9	15 29.6	20 52.8	+ 4 48.6	+0.1422	0.5733	0.1906	+25	-48
$\gamma_2$ Capricorni	5.6	+3.19	+11.0	-15 18.4	21 41.7	+ 5 35.8	-0.1749	0.5727	+0.1919	+24	-50
8 Aquarii	6.8	3.05	11.7	13 26.5	29 6 31.9	- 9 53.4	-0.2945	0.5671	0.2045	+19	-57
9 Aquarii	6.8	3.05	11.9	13 55.3	7 3.1	- 9 23.3	+0.2951	0.5667	0.2052	+51	-24
$\nu$ Aquarii	4.7	2.97	11.7	11 46.6	10 44.1	- 5 50.2	-1.0961	0.5645	0.2098	-28	-90
19 Aquarii	5.8	2.87	12.0	10 10.5	17 35.8	+ 0 46.9	-1.2430	0.5603	0.2175	-40	-90
B. A. C. 7562	5.5	+2.74	+12.6	- 9 29.8	30 2 22.0	+ 9 14.9	+0.0177	0.5555	+0.2257	+38	-39
$\epsilon^1$ Capricorni	5.5	2.74	12.6	9 32.6	2 24.2	+ 9 17.0	+0.0721	0.5555	0.2257	+41	-36
$\epsilon^2$ Capricorni	6.4	2.74	12.8	9 44.3	2 58.1	+ 9 49.7	+0.3972	0.5552	0.2262	+61	-18
30 Aquarii	5.8	2.62	12.6	7 0.4	10 40.7	- 6 43.5	-0.5961	0.5514	0.2318	+ 7	-79
B. A. C. 7704	7.3	2.59	12.5	6 19.1	12 41.9	- 4 46.4	-0.8232	0.5505	0.2330	- 5	-90
B. A. C. 7717	6.9	+2.59	+12.9	- 8 1.2	13 30.4	- 3 59.6	+1.0862	0.5501	+0.2335	+82	+22
44 Aquarii	6.4	2.53	12.7	5 53.3	17 0.8	- 0 36.2	-0.2496	0.5486	0.2353	+26	-54
51 Aquarii	5.8	2.49	12.7	5 20.7	20 14.6	+ 2 31.0	-0.0378	0.5474	0.2368	+37	-42
$\kappa$ Aquarii	5.2	2.40	12.8	4 44.7	31 2 34.3	+ 8 38.1	+0.8604	0.5451	0.2389	+85	+ 7
Lalande 44337	6.3	2.38	12.6	4 4.5	3 59.2	+10 0.2	+0.5176	0.5449	0.2393	+72	-12
3 Piscium	6.4	+2.26	+11.8	- 0 21.2	13 17.2	- 5 0.1	-1.0386	0.5422	+0.2406	-19	-90

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$\kappa$ Piscium	4.7	+2.11	+11.9	+ 0 42.3	1 1 41.9	+ 7 0.3	+0.8631	0.5404	+0.2396	+90	+ 7
9 Piscium	6.6	2.11	12.0	0 34.2	1 50.9	+ 7 9.0	+1.0374	0.5401	0.2396	+90	+19
16 Piscium	5.8	2.06	11.6	1 32.7	6 11.4	+11 21.1	+1.0787	0.5398	0.2384	+90	+22
19 Piscium	4.9	2.00	11.3	2 55.8	10 56.1	- 8 3.4	+0.7873	0.5395	0.2368	+90	+ 3
$\omega$ Piscium	4.2	1.93	10.2	6 18.4	17 3.4	- 2 8.0	-1.2435	0.5395	0.2340	-36	-84
36 Piscium	6.3	+1.85	+ 9.9	+ 7 40.9	2 1 14.7	+ 5 47.3	-0.7663	0.5400	+0.2292	- 2	-77
$\delta$ Piscium	5.3	1.83	10.0	7 37.9	3 9.2	+ 7 38.1	-0.2789	0.5402	0.2279	+25	-54
45 Piscium	6.9	1.81	10.2	7 8.1	5 33.9	+ 9 58.1	+0.7817	0.5405	0.2261	+90	+ 4
75 Piscium	6.0	1.66	8.5	12 25.0	8 0 45.8	+ 4 32.4	-0.5155	0.5440	0.2082	+12	-67
$\eta$ Piscium	3.7	1.57	7.6	14 49.6	12 19.4	- 8 17.0	-0.7045	0.5471	0.1941	+ 1	-75
101 Piscium	6.3	+1.56	+ 7.8	+14 8.8	14 18.7	- 6 21.6	+0.3899	0.5477	+0.1915	+64	-13
104 Piscium	7.5	1.55	7.8	13 46.5	15 54.8	- 4 48.7	+1.0846	0.5482	0.1893	+90	+29
105 Piscium	6.3	1.55	7.3	15 53.7	16 5.5	- 4 38.4	-1.1010	0.5482	0.1890	-26	-74
4 Arietis	5.7	1.52	7.0	16 27.3	19 59.6	- 0 52.1	-0.9615	0.5494	0.1835	-15	-74
$\epsilon$ Arietis	5.7	1.50	6.7	17 19.6	4 0 10.8	+ 3 10.7	-1.1220	0.5507	0.1773	-28	-73
26 Arietis	6.0	+1.42	+ 5.6	+19 24.5	15 13.3	- 6 17.5	-0.8349	0.5554	+0.1525	- 8	-71
B. A. C. 782	7.0	1.41	5.8	18 26.2	16 33.9	- 4 59.7	+0.3951	0.5558	0.1501	+65	- 8
$\mu$ Arietis	6.0	1.40	5.4	19 34.9	20 28.5	- 1 13.1	-0.2433	0.5570	0.1430	+26	-42
47 Arietis	6.0	1.38	4.9	20 15.9	5 3 27.4	+ 5 31.3	-0.0137	0.5590	0.1298	+39	-28
B. A. C. 920	7.0	1.38	4.8	21 13.0	3 48.4	+ 5 51.5	-0.9785	0.5591	0.1291	-18	-69
$\epsilon$ Arietis	4.6	+1.37	+ 4.8	+20 56.3	3 57.5	+ 6 0.4	-0.6625	0.5591	+0.1288	+ 3	-67
$\zeta$ Arietis	4.8	1.34	4.5	20 40.3	10 54.2	-11 17.5	+0.4675	0.5609	0.1150	+71	- 1
$\gamma_1$ Arietis	5.0	1.34	4.4	20 47.0	13 41.2	- 8 36.4	+0.6604	0.5615	0.1093	+90	+10
$\gamma_2$ Arietis	5.3	1.33	4.4	20 22.9	14 22.0	- 7 56.9	+1.1627	0.5616	0.1079	+90	+46
65 Arietis	6.0	1.33	4.3	20 26.8	15 6.2	- 7 14.3	+1.1735	0.5618	0.1064	+90	+47
B. A. C. 1055	6.8	+1.34	+ 4.1	+21 41.1	15 8.7	- 7 11.9	-0.1420	0.5618	+0.1063	+32	-32

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>
66 Arietis	6.0	+1.34	+ 3.9	+22 27.4	5 16 50.0	- 5 34.1	-0.7877	0.5622	+0.1028	- 6	-68
9 Tauri	7.0	1.33	3.8	22 52.7	20 34.0	- 1 58.0	-0.8686	0.5629	0.0949	-11	-67
B. A. C. 1170	6.3	1.33	3.5	23 6.7	6 1 32.6	+ 2 50.1	-0.6744	0.5637	0.0842	+ 1	-64
26 Tauri	7.0	1.33	3.4	23 32.9	1 47.8	+ 3 4.8	-1.1200	0.5637	0.0837	-32	-66
B. A. C. 1189	6.0	1.31	3.6	21 56.3	2 14.9	+ 3 30.9	+0.6386	0.5638	0.0826	+88	+12
32 Tauri	6.0	+1.31	+ 3.4	+22 11.3	5 16.7	+ 6 26.3	+0.6132	0.5641	+0.0760	+85	+11
33 Tauri	6.3	1.32	3.3	22 53.0	5 21.4	+ 6 30.8	-0.1250	0.5642	0.0758	+33	-28
B. A. C. 1238	6.3	1.31	3.2	22 55.1	7 2.9	+ 8 8.8	-0.0372	0.5647	0.0721	+38	-23
36 Tauri	6.0	+1.32	+ 3.1	+23 49.7	8 31.4	+ 9 34.1	-0.9095	0.5645	+0.0689	-14	-66
NEW MOON.											
10 Geminorum	7.0	+1.38	- 0.9	+23 38.4	8 19 51.9	- 5 10.1	-0.5965	0.5545	-0.0635	+ 6	-57
11 Geminorum	7.3	1.38	0.9	23 30.6	20 3.4	- 4 59.0	-0.4654	0.5538	0.0639	+13	-48
12 Geminorum	7.5	1.37	1.0	23 18.9	20 5.2	- 4 57.2	-0.2563	0.5538	0.0639	+25	-35
$\mu$ Geminorum	3.2	1.37	1.2	22 33.9	21 43.7	- 3 22.1	+0.4573	0.5530	0.0673	+70	+ 3
$\delta$ Geminorum	6.0	+1.43	- 2.2	+21 52.8	9 10 54.5	+ 9 22.2	+0.1487	0.5469	-0.0933	+49	-16
$\zeta$ Geminorum	4.0	1.44	2.8	20 43.1	16 48.7	- 8 55.2	+0.8423	0.5439	0.1043	+90	+22
56 Geminorum	5.7	1.49	3.5	20 38.0	10 1 16.9	- 0 43.6	-0.0116	0.5395	0.1192	+38	-28
61 Geminorum	6.0	1.49	3.7	20 27.5	3 40.6	+ 1 35.5	-0.1089	0.5381	0.1233	+34	-33
8 Geminorum	5.3	1.52	4.7	18 45.3	13 1.3	+10 38.4	+0.5474	0.5330	0.1383	+77	0
B. A. C. 2658	7.2	+1.57	- 5.3	+18 31.3	20 12.3	- 6 24.0	-0.2253	0.5291	-0.1489	+27	-42
3 Cancr	6.0	1.56	5.5	17 35.0	20 16.4	- 6 20.0	+0.8007	0.5291	0.1489	+90	+14
$\zeta$ Cancr	4.8	1.60	5.9	17 57.0	11 1 58.0	- 0 48.8	-0.4751	0.5261	0.1568	+14	-58
B. A. C. 2810	7.0	1.64	6.4	17 30.6	8 19.1	+ 5 20.8	-1.0114	0.5228	0.1651	-19	-72
$\delta$ Cancr	6.0	1.63	6.5	17 22.6	8 52.8	+ 5 53.5	-0.9573	0.5225	0.1658	-15	-73
$\xi$ Leonis	5.3	+1.84	-10.2	+11 44.7	12 19 35.6	- 8 24.5	-1.1209	0.5078	-0.2005	-26	-78
$\lambda$ Leonis	5.7	1.83	10.6	10 9.5	19 37.1	- 8 23.0	+0.6322	0.5077	0.2005	+82	- 3
$\sigma$ Leonis	3.8	1.86	11.0	10 20.9	13 0 34.3	- 3 34.2	-0.5814	0.5063	0.2042	+ 9	-73
10 Sextantis	6.0	1.92	11.6	9 24.5	8 51.9	+ 4 29.5	-1.2550	0.5043	0.2095	-38	-81
11 Sextantis	6.0	1.93	11.9	8 47.6	9 47.3	+ 5 23.3	-0.7669	0.5040	0.2101	- 2	-76
$\pi$ Leonis	5.0	+1.93	-12.0	+ 8 31.5	10 55.8	+ 6 29.9	-0.7111	0.5038	-0.2107	+ 1	-82
14 Sextantis	6.6	1.94	13.0	6 6.0	14 32.7	+10 0.8	+1.2075	0.5031	0.2127	+90	+34
16 Sextantis	6.9	1.96	12.9	6 39.7	15 52.9	+11 18.7	+0.3010	0.5029	0.2134	+57	-23
34 Sextantis	6.7	2.10	14.5	4 6.4	14 10 12.7	+ 5 8.1	-0.8584	0.5014	0.2205	- 7	-86
36 Sextantis	6.6	2.10	15.0	3 0.9	11 36.3	+ 6 29.3	+0.0374	0.5014	0.2209	+42	-37
55 Leonis	6.2	+2.15	-15.7	+ 1 16.3	17 23.8	-11 52.7	+0.6739	0.5017	-0.2222	+87	- 4
57 Leonis	6.9	2.15	15.9	0 58.0	17 39.8	-11 37.2	+0.9483	0.5017	0.2223	+90	+13
$\rho^3$ Leonis	5.4	2.19	16.1	+ 0 32.3	21 44.3	- 7 39.6	+0.5122	0.5021	0.2229	+72	-13
$\rho^4$ Leonis	6.9	2.21	16.6	- 0 47.4	15 0 49.1	- 4 39.9	+1.2833	0.5024	0.2233	+89	+40
$\rho^5$ Leonis	5.7	2.25	16.2	+ 0 28.5	3 17.1	- 2 16.2	-0.6565	0.5028	0.2234	+ 5	-85
$\epsilon$ Leonis	5.3	+2.33	-17.3	- 2 27.1	12 17.2	+ 6 29.0	+0.5362	0.5047	-0.2235	+73	-11
B. A. C. 4006	6.1	2.46	18.4	4 46.6	23 26.2	- 6 40.9	+0.5859	0.5081	0.2220	+77	- 9
14 Virginis	6.9	2.65	19.4	8 21.5	16 14 21.3	+ 7 48.6	+1.1842	0.5145	0.2188	+82	+30
7 Virginis	5.7	2.72	19.4	8 54.0	21 48.9	- 8 57.1	+0.1572	0.5173	0.2132	+46	-31
75 Virginis	6.0	3.13	20.0	14 50.9	18 2 58.3	- 4 41.8	+0.5805	0.5387	0.1900	+69	- 8
83 Virginis	6.0	+3.22	-19.6	-15 40.6	8 26.4	+ 0 35.7	+0.4312	0.5432	-0.1838	+58	-16
85 Virginis	6.5	3.22	19.5	15 15.9	8 57.2	+ 1 5.5	-0.0970	0.5436	0.1832	+28	-45
B. A. C. 4722	5.8	3.45	18.7	17 44.1	22 33.2	- 9 46.0	+0.1262	0.5554	0.1646	+37	-33
B. A. C. 4923	7.3	3.80	17.6	20 57.8	19 16 44.7	+ 7 46.7	+0.7553	0.5717	0.1332	+69	+ 3
B. A. C. 5254	5.8	4.13	12.8	23 40.8	20 15 51.1	+ 6 0.6	+1.0203	0.5908	0.0824	+66	+23
$\delta$ Scorpii	2.6	+4.12	-12.0	-22 20.3	18 24.3	+ 8 27.7	-0.5515	0.5926	-0.0761	- 8	-78
19 Scorpii	5.1	4.25	10.4	23 55.8	21 2 18.9	- 7 56.6	+0.5409	0.5979	0.0558	+52	- 9
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	4.24	9.8	23 13.0	4 14.5	- 6 5.6	-0.2821	0.5982	0.0507	+ 4	-57
15 Ophiuchi	7.3	4.31	7.7	22 59.9	11 45.1	+ 1 6.6	-0.8054	0.6031	0.0303	-27	-90
18 Ophiuchi	6.7	4.37	7.5	24 27.9	13 28.7	+ 2 46.0	+0.6235	0.6038	0.0255	+56	- 4
22 Ophiuchi	6.7	+4.35	- 6.9	-23 20.9	15 26.3	+ 4 38.8	-0.5443	0.6046	-0.0200	-13	-78

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	$\gamma$	$\gamma'$	$\gamma''$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
24 Ophiuchi	5.9	+4.34	-6.6	-22 59.5	21 16 11.0	+ 5 21.7	-0.9171	0.6046	-0.0179	-35	-90
B. A. C. 5709	6.3	4.41	6.5	24 56.4	17 21.0	+ 6 28.8	+1.0209	0.6047	0.0147	+65	+24
26 Ophiuchi	6.1	4.41	6.5	24 50.2	17 25.3	+ 6 32.9	+0.9162	0.6055	-0.0145	+65	+15
B. A. C. 5815	7.3	4.46	4.8	25 11.5	23 34.0	-11 33.6	+1.2344	0.6075	+0.0013	+65	+49
39 Ophiuchi (S. star)	5.5	4.44	4.6	24 10.7	22 0 10.3	-10 58.9	+0.2214	0.6077	0.0048	+27	-27
B. A. C. 5831	6.9	+4.42	-4.6	-23 57.8	0 12.5	-10 56.8	+0.0059	0.6077	+0.0049	+15	-39
B. A. C. 5846	6.8	4.46	4.2	24 48.3	1 32.6	-9 40.0	+0.8575	0.6080	0.0087	+65	+11
8 Ophiuchi	3.3	4.46	4.2	24 54.0	1 39.6	-9 33.3	+0.9533	0.6081	0.0090	+65	+18
B. A. C. 5868	7.0	4.49	3.9	24 9.1	2 50.0	-8 25.8	+0.2179	0.6083	0.0124	+28	-27
8 Ophiuchi	4.4	4.45	3.8	24 5.0	3 18.6	-7 58.5	+0.1556	0.6084	0.0137	+24	-31
4 Ophiuchi	5.2	+4.45	-3.2	-23 53.1	5 12.3	-6 9.5	-0.0115	0.6088	+0.0192	+16	-40
B. A. C. 6066	7.3	4.49	-0.3	23 55.5	14 49.6	+ 3 3.6	+0.3452	0.6096	0.0468	+38	-20
4 Sagittarii	5.4	4.49	0.0	23 48.4	15 49.6	+ 4 1.2	+0.2760	0.6096	0.0497	+34	-24
5 Sagittarii	7.0	4.51	0.0	24 16.6	15 58.0	+ 4 9.2	+0.7495	0.6096	0.0501	+66	+ 4
7 Sagittarii	5.9	4.51	+0.3	24 16.9	22 16 57.7	+ 5 6.4	+0.8057	0.6096	0.0529	+66	+ 7
Piazz 17 <sup>h</sup> , 330	5.3	+4.46	+0.4	-23 8.4	17 16.4	+ 5 24.3	-0.3121	0.6096	+0.0539	+ 3	-59
9 Sagittarii	6.0	4.53	0.4	24 21.8	17 20.5	+ 5 28.2	-0.9071	0.6096	0.0540	+66	+14
Piazz 17 <sup>h</sup> , 334	5.3	4.45	0.4	22 50.4	17 23.5	+ 5 31.2	-0.6048	0.6095	0.0542	-13	-84
B. A. C. 6161	5.7	4.49	1.2	23 43.3	20 17.4	+ 8 17.7	+0.4413	0.6093	0.0624	+46	-15
B. A. C. 6336	5.2	4.43	4.0	21 28.8	23 6 9.7	-6 14.6	-1.0294	0.6075	0.0898	-37	-90
B. A. C. 6343	6.3	+4.48	+4.2	-23 35.4	6 21.2	-6 3.6	+1.0777	0.6075	+0.0903	+66	+28
28 Sagittarii	5.6	4.44	5.0	22 29.8	9 19.6	-3 12.6	+0.2753	0.6067	0.0983	+39	-24
30 Sagittarii	6.6	4.43	5.4	22 16.6	11 2.0	-1 34.4	+0.2286	0.6060	0.1028	+36	-27
31 Sagittarii	7.0	4.42	5.3	22 2.3	11 31.6	-1 6.0	+0.0441	0.6059	0.1041	+25	-37
33 Sagittarii	6.0	4.40	5.7	21 28.9	12 14.6	-0 24.8	-0.4315	0.6057	0.1060	+ 1	-68
34 Sagittarii	5.0	+4.45	+5.7	-22 52.1	12 17.0	-0 22.5	+0.9441	0.6056	+0.1061	+67	+16
34 Sagittarii	5.1	4.45	5.8	22 47.7	12 38.5	-0 1.8	+0.9111	0.6055	0.1071	+67	+14
35 Sagittarii	5.7	4.37	6.0	20 47.2	13 31.3	+0 48.8	-0.9809	0.6052	0.1094	-31	-90
35 Sagittarii	3.5	4.39	6.0	21 14.3	13 39.7	+0 56.8	-0.5197	0.6051	0.1097	- 3	-75
36 Sagittarii	3.8	4.40	6.7	21 53.3	16 17.7	+ 3 28.4	+0.4211	0.6041	0.1165	+49	-16
37 Sagittarii	3.1	+4.37	+7.2	-21 10.9	18 15.0	+ 5 20.8	-0.0437	0.6033	+0.1220	+23	-43
B. A. C. 6707	5.9	4.36	8.7	19 4.4	24 4 33.9	-8 45.3	-0.7447	0.5981	0.1462	-12	-90
38 Sagittarii	5.2	4.25	10.7	20 0.1	8 25.5	-5 3.1	+0.7524	0.5960	0.1548	+70	+ 3
57 Sagittarii	6.1	4.21	11.1	19 17.9	10 43.3	-2 50.7	+0.4212	0.5946	0.1598	+53	-17
39 Capricorni	7.0	3.97	14.4	15 29.6	25 4 52.5	-9 23.9	-0.1129	0.5830	0.1940	+27	-45
40 Capricorni	5.6	+3.96	+14.5	-15 18.3	5 40.0	-8 38.2	-0.1450	0.5824	+0.1953	+25	-48
8 Aquarii	6.8	3.84	15.7	13 26.4	14 13.6	-0 24.0	-0.2612	0.5767	0.2082	+21	-55
9 Aquarii	6.8	3.84	15.9	13 55.3	14 43.9	+0 5.2	+0.3197	0.5763	0.2088	+53	-22
v Aquarii	4.7	3.77	16.0	11 46.6	18 18.1	+ 3 31.5	-1.0506	0.5740	0.2135	-24	-90
19 Aquarii	5.8	3.68	16.6	10 10.4	26 0 57.3	+ 9 56.1	-1.1945	0.5697	0.2213	-35	-90
B. A. C. 7562	5.5	+3.57	+17.4	- 9 29.8	9 27.7	-5 51.8	+0.0490	0.5644	+0.2294	+40	-37
41 Capricorni	5.5	3.57	17.4	9 32.5	9 29.9	-5 49.7	+0.1022	0.5644	0.2294	+43	-34
42 Capricorni	6.4	3.57	17.5	9 44.2	10 2.8	-5 18.0	+0.4234	0.5641	0.2299	+62	-17
30 Aquarii	5.8	3.44	17.6	7 0.3	17 32.0	+ 1 55.3	-0.5558	0.5598	0.2353	+ 9	-76
B. A. C. 7704	7.3	3.42	17.6	6 19.0	19 29.8	+ 3 49.0	-0.7798	0.5588	0.2365	- 3	-90
B. A. C. 7717	6.9	+3.43	+18.1	- 8 1.1	20 16.8	+ 4 34.3	+1.1039	0.5584	+0.2370	+82	+24
44 Aquarii	6.4	3.37	17.8	5 53.2	23 41.7	+ 7 52.2	-0.2137	0.5566	0.2387	+27	-52
51 Aquarii	5.8	3.33	17.9	5 20.6	27 2 50.1	+10 54.1	-0.0051	0.5551	0.2401	+39	-40
κ Aquarii	5.2	3.25	18.1	4 44.6	9 0.1	-7 8.5	+0.8823	0.5523	0.2420	+85	+ 8
Lalande 44337	6.3	3.24	18.1	4 4.4	10 22.8	-5 48.7	+0.5432	0.5512	0.2423	+73	-11
3 Piscium	6.4	+3.11	+17.4	-0 21.1	19 27.8	+ 2 58.0	-1.0013	0.5484	+0.2433	-17	-90
κ Piscium	4.7	2.97	17.5	+0 42.4	28 7 37.5	-9 16.7	+0.8861	0.5453	0.2416	+90	+ 9
9 Piscium	6.6	2.97	17.6	0 34.3	7 46.4	-9 8.1	+1.0585	0.5453	0.2416	+90	+20
16 Piscium	5.8	2.91	17.2	1 32.8	12 2.3	-5 5.6	+1.1000	0.5442	0.2402	+90	+23
19 Piscium	4.9	2.86	16.7	2 55.9	16 42.4	-0 29.8	+0.8108	0.5434	0.2383	+90	+ 4
ω Piscium	4.2	+2.80	+15.6	+ 6 18.5	22 44.6	+ 5 20.5	-1.2052	0.5427	+0.2352	-32	-84

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	$\gamma$	$\alpha'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
36 Piscium	6.3	+2.71	+15.3	+ 7 41.0	29 6 50.2	-10 49.9	-0.7336	0.5423	+0.2300	0	-81
38 Piscium	6.9	2.71	15.1	8 19.0	7 13.4	-10 27.4	-1.2952	0.5423	0.2297	-43	-82
d Piscium	5.3	2.69	15.3	7 38.0	8 43.4	- 9 0.4	-0.2502	0.5423	0.2285	+26	-52
45 Piscium	6.9	2.67	15.4	7 8.2	11 6.8	- 6 41.7	+0.8042	0.5423	0.2267	+90	+ 5
75 Piscium	6.0	2.50	13.1	12 25.1	30 6 12.4	+11 46.4	-0.4911	0.5438	0.2079	+13	-66
$\eta$ Piscium	3.7	+2.40	+11.8	+14 49.7	17 45.7	- 1 3.3	-0.6830	0.5458	+0.1934	+ 2	-75
101 Piscium	6.3	2.38	11.9	14 8.9	19 45.1	+ 0 52.1	+0.4096	0.5462	0.1907	+65	-12
104 Piscium	7.5	2.37	11.8	13 46.6	21 21.5	+ 2 25.4	+1.1040	0.5405	0.1885	+90	+31
105 Piscium	6.3	+2.38	+11.2	+15 53.8	21 32.2	+ 2 35.7	-1.0805	0.5465	+0.1882	-24	-74

JULY.

4 Arietis	5.7	+2.35	+10.8	+16 27.4	1 1 26.9	+ 6 22.5	-0.9426	0.5474	+0.1826	-14	-74
i Arietis	5.7	2.31	10.3	17 19.6	5 39.1	+10 26.3	-1.1043	0.5484	0.1763	-27	-73
26 Arietis	6.0	+2.22	+ 8.8	+19 24.6	20 47.3	+ 1 3.8	-0.8213	0.5521	+0.1514	- 7	-71
B. A. C. 782	7.0	2.17	9.1	18 26.2	22 8.6	+ 2 22.3	+0.4108	0.5524	0.1490	+66	- 8
$\mu$ Arietis	6.0	2.17	8.2	19 35.0	2 2 5.2	+ 6 10.9	-0.2294	0.5534	0.1419	+27	-41
47 Arietis	6.0	2.13	7.6	20 15.9	9 7.8	-11 0.9	-0.0010	0.5550	0.1288	+40	-27
B. A. C. 920	7.0	2.13	7.3	21 13.1	9 29.1	-10 40.3	-0.9683	0.5551	0.1281	-17	-69
e Arietis	4.6	+2.13	+ 7.4	+20 56.3	9 38.3	-10 31.4	-0.6515	0.5552	+0.1278	+ 3	-66
z Arietis	4.8	2.08	6.6	20 40.3	16 39.3	- 3 45.0	+0.4811	0.5567	0.1140	+72	0
$\gamma_1$ Arietis	5.0	2.06	6.6	20 47.1	19 28.1	- 1 2.0	+0.6742	0.5573	0.1084	+90	+11
$\gamma_2$ Arietis	5.3	2.05	6.7	20 23.0	20 9.4	- 0 22.1	+1.1781	0.5575	0.1070	+90	+47
65 Arietis	6.0	2.05	6.6	20 26.8	20 54.1	+ 0 21.0	+1.1890	0.5576	0.1054	+90	+48
B. A. C. 1055	6.8	+2.05	+ 6.3	+21 41.2	20 56.6	+ 0 23.4	-0.1312	0.5576	+0.1054	+32	-32
66 Arietis	6.0	2.05	5.9	22 27.4	22 39.0	+ 2 2.3	-0.7794	0.5579	0.1019	- 5	-68
9 Tauri	7.0	2.02	5.5	22 52.7	2 25.6	+ 5 41.0	-0.8611	0.5586	0.0940	-11	-67
B. A. C. 1170	6.3	1.99	5.0	23 6.7	7 27.5	+10 32.3	-0.6670	0.5593	0.0834	+ 2	-64
26 Tauri	7.0	2.00	4.9	23 32.9	7 43.0	+10 47.4	-1.1142	0.5594	0.0829	-31	-66
B. A. C. 1189	6.0	+1.97	+ 5.2	+21 56.4	8 10.4	+11 13.7	+0.6512	0.5594	+0.0819	+90	+13
32 Tauri	6.0	1.96	4.9	22 11.3	11 14.3	- 9 48.8	+0.6254	0.5598	0.0753	+87	+12
33 Tauri	6.3	1.96	4.7	22 53.0	11 19.0	- 9 44.2	-0.1158	0.5598	0.0752	+33	-28
B. A. C. 1238	6.3	1.95	4.6	22 55.1	13 1.7	- 8 5.1	-0.0279	0.5600	0.0714	+38	-23
36 Tauri	6.0	1.95	4.2	23 49.7	14 31.3	- 6 38.6	-0.9038	0.5602	0.0682	-14	-66
B. A. C. 1347	7.3	+1.91	+ 3.4	+24 10.3	22 57.1	+ 1 29.5	-0.7791	0.5607	+0.0497	- 6	-66
62 Tauri	6.0	1.92	3.4	24 4.0	23 10.5	+ 1 42.4	-0.6543	0.5607	0.0492	+ 2	-61
$\nu^1$ Tauri	4.7	1.88	3.6	22 35.1	4 0 13.0	+ 2 42.7	+0.9952	0.5608	0.0469	+90	+38
$\nu^2$ Tauri	6.0	1.89	3.5	22 46.2	0 39.1	+ 3 8.0	+0.8167	0.5608	0.0459	+90	+26
$\tau$ Tauri	4.5	1.85	2.9	22 45.8	7 14.9	+ 9 29.9	+1.0793	0.5607	0.0312	+90	+45
95 Tauri	6.3	+1.87	+ 2.7	+23 53.9	7 39.5	+ 9 53.7	-0.1366	0.5607	+0.0303	+32	-25
B. A. C. 1463	6.3	1.85	2.7	23 26.6	8 45.7	+10 57.5	+0.3882	0.5607	0.0278	+66	+ 4
99 Tauri	6.0	1.85	2.0	23 47.5	14 6.1	- 7 53.3	+0.1279	0.5604	0.0158	+47	- 9
k Tauri	6.0	1.83	2.0	24 53.7	14 13.9	- 7 45.8	-1.0680	0.5603	0.0155	-28	-65
103 Tauri	6.0	1.82	1.6	24 7.9	18 39.2	- 3 29.7	-0.1936	0.5599	+0.0056	+29	-26
118 Tauri	5.7	+1.80	+ 0.6	+25 4.1	5 4 2.5	+ 5 34.0	-1.2610	0.5584	-0.0152	-56	-65
121 Tauri	6.0	1.77	0.5	23 58.3	6 49.3	+ 8 15.0	-0.1162	0.5578	0.0214	+33	-23
VENUS				22 48.9	9 26.5	+10 46.7	+1.0848	0.5024	0.0313	+90	+40
B. A. C. 1801	6.0	1.75	+ 0.3	23 9.4	10 21.8	+11 40.2	+0.6843	0.5570	0.0285	+90	+20
132 Tauri	5.3	1.76	- 0.1	24 32.0	12 53.4	- 9 53.4	-0.9003	0.5564	0.0346	-14	-65
140 Tauri	7.0	+1.73	- 0.4	+22 53.6	18 5.4	- 4 52.0	+0.6842	0.5549	-0.0437	+90	+18
141 Tauri	6.7	1.72	0.4	22 23.9	18 39.2	- 4 19.4	+1.2016	0.5547	0.0469	+90	+55
1 Geminorum	5.0	1.73	0.5	23 16.1	19 44.1	- 3 16.8	+0.1960	0.5544	0.0492	+52	- 9
2 Geminorum	7.2	1.73	0.7	23 38.8	20 29.6	- 2 32.6	-0.2568	0.5541	0.0508	+25	-33
3 Geminorum	6.3	1.72	0.8	23 7.8	22 17.1	- 0 48.9	+0.2163	0.5535	0.0546	+53	- 8
4 Geminorum	7.4	+1.72	- 0.8	+23 0.8	22 38.2	- 0 28.6	+0.3237	0.5534	-0.0553	+60	- 3

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
5 Geminorum	6.7	+1.73	-1.0	+24 26.5	5 23 4.7	-0 2.9	-1.2663	0.5533	-0.0562	-56	-66
6 Geminorum	6.7	+1.71	-0.9	+22 55.9	23 27.9	+0 19.5	+0.3678	0.5531	-0.0570	+63	0
NEW MOON.											
51 Cancri	4.8	+1.65	-5.9	+17 57.0	8 8 43.7	+7 44.4	-0.4575	0.5269	-0.1569	+15	-57
B. A. C. 2810	7.0	+1.66	-6.4	+17 30.6	15 4.9	-10 5.9	-0.9933	0.5246	-0.1652	-18	-72
d <sup>2</sup> Cancri	6.0	1.65	6.4	17 22.6	15 38.6	-9 33.2	-0.9389	0.5235	0.1659	-14	-73
ξ Leonis	5.3	1.73	9.4	11 44.7	10 2 20.8	+0 8.3	-1.0929	0.5089	0.2007	-24	-78
λ Leonis	5.7	1.72	9.6	10 9.5	2 22.3	+0 9.8	+0.6637	0.5089	0.2007	+37	-1
ο Leonis	3.8	1.74	10.0	10 20.9	7 19.7	+4 58.7	-0.5507	0.5073	0.2043	+10	-70
10 Sextantis	6.0	+1.78	-10.6	+9 24.5	15 37.8	-10 57.1	-1.2238	0.5050	-0.2095	-35	-81
11 Sextantis	6.0	1.78	10.8	8 47.6	16 33.3	-10 3.2	-0.7339	0.5048	0.2100	0	-80
π Leonis	5.0	1.78	10.9	8 31.5	17 42.0	-8 56.4	-0.6779	0.5045	0.2107	+4	-81
14 Sextantis	6.6	1.78	11.6	6 6.1	21 19.2	-5 25.2	+1.2488	0.5038	0.2126	+90	+38
16 Sextantis	6.9	1.80	11.5	6 39.8	22 39.6	-4 7.1	+0.3395	0.5034	0.2133	+60	-20
34 Sextantis	6.7	+1.90	-13.0	+4 6.4	11 17 3.6	-10 13.4	-0.8186	0.5010	-0.2200	-5	-86
36 Sextantis	6.6	1.91	13.4	3 0.9	18 27.9	-8 51.5	+0.0810	0.5009	0.2204	+44	-35
55 Leonis	6.2	1.95	14.0	1 16.3	12 0 17.4	-3 10.5	+0.7236	0.5008	0.2215	+90	-1
57 Leonis	6.9	1.95	14.1	0 58.1	0 33.5	-2 55.9	+1.0000	0.5008	0.2216	+90	+16
ρ <sup>2</sup> Leonis	5.4	1.97	14.4	+0 32.3	4 39.9	+1 3.8	+0.5623	0.5009	0.2221	+76	-10
ρ <sup>4</sup> Leonis	6.9	+2.00	-14.8	-0 47.4	7 46.3	+4 5.0	+1.3391	0.5011	-0.2223	+89	+48
ρ <sup>6</sup> Leonis	5.7	2.02	14.5	+0 28.5	10 15.5	+6 30.1	-0.6115	0.5012	0.2225	+7	-80
ε Leonis	5.3	2.09	15.5	-2 27.0	19 21.3	-8 39.2	+0.5909	0.5024	0.2222	+78	-8
B. A. C. 4006	6.1	2.19	16.5	4 46.6	18 6 38.7	+2 19.3	+0.6430	0.5049	0.2204	+82	-6
14 Virginis	6.9	2.36	17.5	8 21.5	21 48.2	-6 56.9	+1.2510	0.5047	0.2153	+82	+37
γ Virginis	5.7	+2.44	-17.6	-8 54.0	14 5 24.1	+0 25.8	+0.2167	0.5135	-0.2114	+50	-28
75 Virginis	6.0	2.87	18.4	14 50.9	15 11 12.9	+5 20.5	+0.6454	0.5317	0.1875	+73	-5
83 Virginis	6.0	2.97	18.4	15 40.6	16 49.3	+10 46.4	+0.4942	0.5358	0.1813	+62	-13
85 Virginis	6.5	2.97	18.2	15 15.9	17 20.9	+11 16.9	-0.0402	0.5362	0.1807	+31	-42
B. A. C. 4722	5.8	3.21	17.7	17 44.1	16 7 18.3	+0 47.0	+0.1839	0.5474	0.1623	+41	-29
B. A. C. 4923	7.3	+3.61	-17.2	-20 57.8	17 1 58.8	-5 11.3	+0.8158	0.5633	-0.1315	+69	+7
B. A. C. 5254	5.8	4.02	12.8	23 40.8	18 1 39.6	-6 22.8	+1.0714	0.5835	0.0817	+66	+27
δ Scorpii	2.6	4.05	11.9	22 20.3	4 16.3	-3 52.1	-0.5135	0.5852	0.0755	-7	-75
19 Scorpii	5.1	4.20	10.6	23 55.8	12 20.9	+3 53.5	+0.5848	0.5912	0.0555	+55	-6
ρ Ophiuchi (S. star)	5.0	4.22	9.9	23 13.0	14 18.8	+5 46.9	-0.2457	0.5923	0.0505	+6	-55
15 Ophiuchi	7.3	+4.34	-7.8	-22 59.9	21 57.6	-10 52.7	-0.7763	0.5970	-0.0305	-25	-90
18 Ophiuchi	6.7	4.38	7.7	24 28.0	23 42.9	-9 11.6	+0.6615	0.5980	0.0257	+59	-2
22 Ophiuchi	6.7	4.40	7.0	23 20.9	19 1 42.4	-7 16.9	-0.5148	0.5990	0.0203	-11	-75
24 Ophiuchi	5.9	4.39	6.7	22 59.5	2 27.9	-6 33.3	-0.8901	0.5994	0.0183	-33	-90
B. A. C. 5709	6.3	4.44	6.9	24 56.4	3 38.8	-5 25.3	+1.0587	0.6000	0.0151	+65	+27
26 Ophiuchi	6.1	+4.44	-6.9	-24 50.2	3 43.2	-5 21.1	+0.9534	0.6000	-0.0148	+65	+18
39 Ophiuchi (S. star)	5.5	4.51	4.8	24 10.7	10 33.9	+1 12.9	+0.2505	0.6031	+0.0041	+29	-25
B. A. C. 5831	6.9	4.51	4.8	23 57.8	10 36.2	+1 15.1	+0.0340	0.6031	0.0043	+16	-38
B. A. C. 5846	6.8	4.53	4.6	24 48.3	11 57.2	+2 32.8	+0.8886	0.6036	0.0080	+65	+13
θ Ophiuchi	3.3	4.54	4.6	24 54.0	12 4.2	+2 39.5	+0.9848	0.6036	0.0084	+65	+20
B. A. C. 5868	7.0	+4.56	-4.3	-24 9.1	13 15.5	+3 47.9	+0.2453	0.6041	+0.0117	+29	-26
δ Ophiuchi	4.4	4.55	4.0	24 5.0	13 44.4	+4 15.6	+0.1821	0.6049	0.0134	+26	-29
α Ophiuchi	5.2	4.56	3.4	23 53.1	15 39.4	+6 5.8	+0.0136	0.6049	0.0185	+17	-39
B. A. C. 6066	7.3	4.65	0.4	23 55.5	1 21.5	-8 36.3	+0.3649	0.6072	0.0460	+39	-19
4 Sagittarii	5.4	4.65	0.2	28 48.4	2 21.9	-7 38.3	+0.2949	0.6072	0.0489	+35	-23
5 Sagittarii	7.0	+4.66	-0.1	-24 16.6	2 30.4	-7 30.2	+0.7692	0.6072	+0.0492	+66	+5
7 Sagittarii	5.9	4.67	+0.1	24 16.9	3 30.4	-6 32.7	+0.8248	0.6073	0.0521	+66	+9
Piazz 17 <sup>b</sup> , 330	5.3	4.65	0.4	23 8.4	3 49.1	-6 14.8	-0.2951	0.6074	0.0530	-4	-58
9 Sagittarii	6.0	4.67	0.2	24 21.8	3 53.4	-6 10.7	+0.9260	0.6074	0.0532	+66	+16
Piazz 17 <sup>b</sup> , 334	5.3	4.65	0.5	22 50.4	3 56.2	-6 8.0	-0.5884	0.6074	0.0533	-12	-82
B. A. C. 6161	5.7	+4.68	+1.2	-23 43.3	6 51.0	-3 20.5	+0.4571	0.6076	+0.0615	+47	-14

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	$\gamma$	$\alpha'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
B. A. C. 6336	6.2	+4.67	+ 4.4	-21 28.8	20 16 44.3	+ 6 8.1	-1.0197	0.6074	+0.0891	-36	-90
B. A. C. 6343	6.3	4.72	4.2	23 35.4	16 55.8	+ 6 19.2	+1.0850	0.6073	0.0896	+66	+28
28 Sagittarii	5.6	4.71	5.2	22 29.8	19 53.9	+ 9 9.9	+0.2815	0.6069	0.0976	+39	-24
30 Sagittarii	6.6	4.71	5.8	22 16.6	21 36.1	+10 47.8	+0.2332	0.6067	0.1022	+36	-27
31 Sagittarii	7.0	4.71	6.0	22 3.3	22 5.6	+11 16.1	+0.0487	0.6066	0.1035	+25	-37
33 Sagittarii	6.0	+4.70	+ 6.2	-21 28.9	22 48.5	+11 57.2	-0.4263	0.6064	+0.1054	+ 1	-67
34 Sagittarii	5.0	4.72	6.1	22 52.1	22 50.9	+11 59.6	+0.9462	0.6064	0.1055	+67	+16
35 Sagittarii	5.1	4.72	6.2	22 47.7	23 12.2	-11 40.0	+0.9128	0.6064	0.1065	+67	+14
36 Sagittarii	5.7	4.68	6.7	20 47.2	21 0 4.9	-10 49.4	-0.9753	0.6062	0.1088	-31	-90
37 Sagittarii	3.5	4.70	6.7	21 14.2	0 13.2	-10 41.5	-0.5155	0.6061	0.1092	- 3	-75
38 Sagittarii	3.8	+4.71	+ 7.3	-21 53.2	2 50.5	- 8 10.6	+0.4208	0.6055	+0.1160	+49	-16
39 Sagittarii	3.1	4.70	7.9	21 10.9	4 47.1	- 6 18.7	-0.0445	0.6050	0.1210	+23	-42
B. A. C. 6707	5.9	4.63	11.0	19 4.4	15 0.3	+ 3 29.3	+0.7504	0.6015	0.1461	-13	-90
40 Sagittarii	5.2	4.64	11.9	20 0.0	18 49.5	+ 7 9.1	+0.7359	0.5999	0.1550	+69	+ 2
57 Sagittarii	6.1	4.63	12.5	19 17.9	21 5.5	+ 9 19.7	+0.4038	0.5989	0.1601	+52	-18
41 Capricorni	7.0	+4.47	+16.8	-15 29.6	22 14 55.6	+ 2 27.3	-0.1410	0.5897	+0.1954	+25	-48
42 Capricorni	5.6	4.46	16.9	15 18.3	15 42.0	+ 3 11.9	-0.1734	0.5892	0.1968	+24	-50
43 Aquarii	6.8	4.38	18.5	13 26.4	23 0 3.9	+11 14.4	-0.2955	0.5844	0.2101	+19	-57
44 Aquarii	6.8	4.39	18.6	13 55.2	0 33.4	+11 42.8	+0.2783	0.5841	0.2108	+50	-24
45 Aquarii	4.7	4.34	19.0	11 46.5	4 2.2	- 8 56.3	-1.0793	0.5821	0.2157	-27	-90
46 Aquarii	5.8	+4.26	+19.9	-10 10.4	10 30.7	- 2 42.5	-1.2259	0.5784	+0.2238	-39	-90
B. A. C. 7562	5.5	4.19	21.2	9 29.7	18 46.3	+ 5 14.8	-0.0060	0.5737	0.2324	+34	-40
47 Capricorni	5.5	4.19	21.2	9 32.4	18 48.4	+ 5 16.8	+0.0467	0.5737	0.2324	+40	-37
48 Capricorni	6.4	4.18	21.3	9 44.2	19 20.4	+ 5 47.6	+0.3613	0.5734	0.2329	+58	-20
30 Aquarii	5.8	4.10	21.8	7 0.3	24 2 35.8	-11 13.0	-0.6104	0.5710	0.2392	+ 6	-80
B. A. C. 7704	7.3	+4.07	+21.9	- 6 19.0	4 29.9	- 9 23.0	-0.8312	0.5686	+0.2399	- 7	-90
B. A. C. 7717	6.9	4.09	22.2	8 1.0	5 15.5	- 8 39.0	+1.0245	0.5682	0.2404	+82	+20
49 Aquarii	6.4	4.04	22.3	5 53.1	8 33.7	- 5 27.9	-0.2764	0.5666	0.2422	+24	-55
51 Aquarii	5.8	4.01	22.4	5 20.5	11 36.1	- 2 32.1	-0.0733	0.5652	0.2436	+35	-44
52 Aquarii	5.2	3.95	22.9	4 44.6	17 33.9	+ 3 13.1	+0.7956	0.5625	0.2457	+85	+ 3
Lalande 44337	6.3	+3.94	+23.0	- 4 4.3	18 53.9	+ 4 30.2	+0.4609	0.5619	+0.2461	+67	-15
3 Piscium	6.4	3.84	22.6	- 0 21.0	25 3 40.6	-11 1.4	-1.0610	0.5586	0.2471	-20	-90
4 Piscium	4.7	3.73	22.7	+ 0 42.5	15 25.9	+ 0 19.4	+0.7830	0.5549	0.2454	+90	+ 2
9 Piscium	6.6	3.74	22.8	0 34.4	15 34.5	+ 0 27.7	+0.9530	0.5549	0.2454	+90	+13
16 Piscium	5.8	3.68	22.6	1 32.9	19 42.0	+ 4 26.8	+0.9909	0.5539	0.2440	+90	+16
19 Piscium	4.9	+3.64	+22.2	+ 2 56.0	26 0 13.0	+ 8 48.5	+0.7037	0.5530	+0.2420	+90	- 2
36 Piscium	6.3	3.53	20.9	7 41.1	13 54.5	- 1 57.9	-0.8244	0.5510	0.2332	- 5	-82
47 Piscium	5.3	3.51	20.9	7 38.1	15 44.5	- 0 11.6	+0.3481	0.5508	0.2317	+21	-58
45 Piscium	6.9	3.49	20.9	7 8.3	18 3.6	+ 2 2.8	+0.6900	0.5506	0.2298	+90	- 1
75 Piscium	6.0	3.36	18.5	12 25.2	27 12 38.9	- 3 59.6	-0.5931	0.5505	0.2102	+ 8	-72
76 Piscium	3.7	+3.28	+17.0	+14 49.8	23 57.0	+ 6 55.4	-0.7845	0.5512	+0.1953	- 3	-75
101 Piscium	6.3	3.26	16.9	14 9.0	28 1 54.0	+ 8 48.5	+0.2961	0.5514	0.1925	+57	-18
104 Piscium	7.5	3.25	16.8	13 46.7	3 28.5	+10 19.9	+0.9831	0.5516	0.1902	+90	+21
105 Piscium	6.3	3.26	16.1	15 53.9	3 39.0	+10 30.0	-1.1783	0.5516	0.1899	-33	-74
4 Arietis	5.7	3.23	15.7	16 27.4	7 29.4	- 9 47.5	-1.0423	0.5521	0.1841	-22	-74
5 Arietis	5.7	+3.20	+15.0	+17 19.7	11 37.3	- 5 48.0	-1.2028	0.5526	+0.1777	-36	-73
26 Arietis	6.0	3.10	12.9	19 24.6	29 2 32.8	- 8 36.7	-0.9222	0.5546	0.1523	-14	-71
B. A. C. 782	7.0	3.07	13.1	18 26.3	3 53.1	+ 9 54.2	+0.3008	0.5553	0.1498	+58	-13
47 Arietis	6.0	3.06	12.1	19 35.1	7 47.3	-10 19.6	-0.3340	0.5554	0.1426	+21	-47
48 Arietis	6.0	3.01	11.2	20 16.0	14 46.3	- 3 35.1	-0.1052	0.5563	0.1293	+34	-33
B. A. C. 920	7.0	+3.01	+10.9	+21 13.1	15 7.4	- 3 14.7	-1.0669	0.5564	+0.1286	-25	-69
49 Arietis	4.6	3.01	10.9	20 56.4	15 16.5	- 3 5.9	-0.7518	0.5564	0.1283	- 3	-69
50 Arietis	4.8	2.94	10.2	20 40.4	22 14.8	+ 3 37.9	+0.3766	0.5573	0.1145	+63	- 6
51 Arietis	5.0	2.92	9.8	20 47.1	30 1 2.8	+ 6 20.1	+0.5702	0.5576	0.1088	+80	+ 6
52 Arietis	5.3	2.91	9.7	20 23.0	1 43.9	+ 6 59.8	+1.0723	0.5577	+0.1074	+90	+38
65 Arietis	6.0	+2.92	+ 9.8	+20 26.9	2 28.4	+ 7 42.7	+1.0833	0.5578	+0.1059	+90	+39



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
		$\alpha$	$\delta$	$^{\circ}$ $'$	d h m	h m				$^{\circ}$	$'$	
B. A. C. 1055	6.8	+2.93	+ 9.3	+21 41.2	30 2 31.0	+ 7 45.2	-0.2308	0.5578	+0.1058	+27	-37	
66 Arietis	6.0	2.92	8.8	22 27.5	4 13.0	+ 9 23.7	-0.8759	0.5579	0.1016	-11	-68	
9 Tauri	7.0	2.89	8.2	22 52.7	7 58.9	-10 58.3	-0.9558	0.5583	0.0944	-17	-67	
B. A. C. 1170	6.3	2.85	7.5	23 6.8	13 0.2	- 6 7.6	-0.7607	0.5586	0.0838	- 4	-67	
26 Tauri	7.0	2.85	7.3	23 33.0	13 15.7	- 5 52.5	-1.2064	0.5587	0.0832	-42	-66	
B. A. C. 1189	6.0	+2.82	+ 7.8	+21 56.4	13 43.0	- 5 26.2	+0.5536	0.5587	+0.0822	+78	+ 7	
32 Tauri	6.0	2.80	7.3	22 11.3	16 46.7	- 2 28.9	+0.5295	0.5589	0.0757	+76	+ 7	
33 Tauri	6.3	2.80	7.1	22 53.0	16 51.5	- 2 24.3	-0.2108	0.5589	0.0755	+28	-33	
B. A. C. 1238	6.3	2.80	6.9	22 55.1	18 34.3	- 0 45.0	-0.1209	0.5589	0.0718	+33	-28	
36 Tauri	6.0	2.80	6.4	23 49.8	20 3.8	+ 0 41.3	-0.9941	0.5589	0.0686	-21	-66	
A' Tauri	4.6	+2.77	+ 7.0	+21 48.5	20 14.5	+ 0 51.6	+1.1887	0.5589	+0.0682	+90	+52	
B. A. C. 1347	7.3	2.74	5.2	24 10.3	31 4 30.3	+ 8 50.0	-0.8656	0.5590	0.0501	-11	-66	
62 Tauri	6.0	2.73	5.2	24 4.0	4 43.7	+ 9 3.0	-0.7409	0.5590	0.0496	- 3	-66	
v' Tauri	4.7	2.70	5.5	22 35.2	5 46.4	+10 3.4	+0.9068	0.5590	0.0473	+90	+31	
v' Tauri	6.4	2.69	5.4	22 46.2	6 12.6	+10 28.8	+0.7288	0.5590	0.0463	+90	+20	
7 Tauri	4.2	+2.64	+ 4.5	+22 45.9	12 49.5	- 7 8.2	+0.9957	0.5586	+0.0317	+90	+39	
95 Tauri	6.3	2.65	4.0	23 53.9	13 14.3	- 6 44.2	+0.2188	0.5586	0.0308	+27	-30	
B. A. C. 1463	6.3	2.64	4.1	23 26.6	14 20.6	- 5 40.3	+0.3062	0.5585	0.0283	+59	- 1	
99 Tauri	6.0	2.61	3.3	23 47.5	19 42.4	- 0 29.7	+0.0496	0.5579	0.0164	+43	-13	
k Tauri	6.0	+2.60	+ 3.3	+24 53.7	19 50.2	- 0 22.1	-1.1459	0.5579	+0.0162	-36	-65	

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103 Tauri	6.0	+2.56	+ 2.6	+24 7.9	1 0 16.9	+ 3 55.3	-0.2687	0.5574	+0.0063	+24	-30
121 Tauri	6.0	2.46	1.1	23 58.3	12 31.0	- 8 15.8	-0.1825	0.5550	-0.0205	+29	-26
B. A. C. 1801	6.0	+2.42	+ 0.8	+23 9.4	16 4.9	- 4 49.3	+0.6218	0.5542	-0.0284	+87	+16
132 Tauri	5.3	2.42	+ 0.2	24 32.0	18 37.4	- 2 21.9	-0.9622	0.5536	0.0336	-19	-65
140 Tauri	7.0	2.35	- 0.1	22 53.6	23 51.4	+ 2 41.4	+0.6294	0.5521	0.0446	+88	+15
141 Tauri	6.7	2.34	0.0	22 23.9	2 0 25.5	+ 3 14.3	+1.1469	0.5520	0.0458	+90	+50
1 Geminorum	5.0	2.35	0.4	23 16.1	1 30.8	+ 4 17.3	+0.1412	0.5516	0.0481	+48	-11
2 Geminorum	7.2	+2.35	- 0.6	+23 38.9	2 16.7	+ 5 1.7	-0.3117	0.5514	-0.0497	+22	-37
3 Geminorum	6.3	2.33	0.7	23 7.8	4 4.7	+ 6 46.1	-0.1638	0.5508	0.0534	+50	-10
4 Geminorum	7.4	2.33	0.7	23 0.8	4 26.1	+ 7 6.7	+0.2710	0.5507	0.0541	+56	- 5
6 Geminorum	6.7	2.32	0.8	22 55.9	5 16.1	+ 7 55.1	+0.3165	0.5504	0.0558	+59	- 3
7 Geminorum	3.5	2.30	0.8	22 32.1	6 27.2	+ 9 3.8	+0.6833	0.5501	0.0582	+90	+17
8 Geminorum	6.5	+2.33	- 1.2	+24 0.1	7 4.8	+ 9 40.2	-0.9638	0.5499	-0.0595	-19	-66
9 Geminorum	6.3	2.32	1.2	23 46.5	7 23.3	+ 9 58.0	-0.7324	0.5497	0.0602	- 3	-66
10 Geminorum	7.0	2.31	1.3	23 38.4	8 16.7	+10 49.6	-0.6394	0.5495	0.0623	+ 3	-61
11 Geminorum	7.3	2.31	1.3	23 30.5	8 28.3	+11 0.8	-0.5074	0.5494	0.0623	+11	-51
12 Geminorum	7.5	2.29	1.0	23 18.9	8 30.1	+11 2.6	-0.2967	0.5494	0.0624	+23	-37
$\mu$ Geminorum	3.2	+2.28	- 1.3	+22 33.9	10 10.0	+11 20.9	+0.4215	0.5488	-0.0658	+67	+ 2
d Geminorum	6.0	2.18	2.7	21 52.8	23 30.0	+ 1 32.7	+0.1260	0.5438	0.0917	+47	-17
$\zeta$ Geminorum	4.0	2.13	3.2	20 43.0	8 5 27.7	+ 7 18.7	+0.8296	0.5413	0.1026	+90	+21
56 Geminorum	5.7	2.08	4.1	20 38.0	14 0.2	- 8 25.2	-0.0175	0.5381	0.1176	+39	-27
61 Geminorum	6.0	2.07	4.3	20 27.5	16 24.9	- 6 5.2	-0.1121	0.5366	0.1216	+33	-33
g Geminorum	5.3	+2.00	- 4.1	+18 45.3	4 1 48.9	+ 3 1.1	+0.5596	0.5324	-0.1367	+78	+ 1
B. A. C. 2658	7.2	1.97	5.7	18 31.3	9 1.8	+10 0.6	-0.2060	0.5292	0.1474	+28	+11
3 Cancri	6.0	+1.96	5.6	17 35.0	9 5.9	+10 4.6	+0.8238	0.5291	-0.1475	+90	+15
NEW MOON.											
14 Sextantis	6.6	+1.79	-10.7	+ 6 6.1	7 3 21.2	+ 2 24.3	+1.3399	0.5054	-0.2120	+90	+51
16 Sextantis	6.9	1.80	10.7	6 39.8	4 41.3	+ 3 42.1	+0.4316	0.5052	0.2127	+66	-15
MERCURY				6 18.2	10 48.0	+ 9 38.6	-0.4779	0.5167	0.2131	+13	-67
34 Sextantis	6.7	1.83	11.9	4 6.4	23 3.0	- 2 26.6	-0.7054	0.5027	0.2196	+ 2	-86
36 Sextantis	6.6	1.83	12.1	3 0.9	8 0 27.1	- 1 4.8	+0.1977	0.5026	0.2199	+51	-29
55 Leonis	6.2	+1.85	-12.6	+ 1 16.3	6 16.2	+ 4 34.7	+0.8485	0.5024	-0.2210	+90	+ 6

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
57 Leonis	6.9	+1.85	-12.7	+ 0 58.1	8 6 32.3	+ 4 50.4	+1.1256	0.5024	-0.2211	+90	+25
$\beta$ Leonis	5.4	1.86	12.9	0 32.4	10 38.5	+ 8 49.8	+0.6921	0.5024	0.2221	+90	- 3
$\gamma$ Leonis	5.7	1.89	13.1	+ 0 28.6	16 14.0	- 9 43.9	-0.4785	0.5026	0.2219	+14	-69
$\epsilon$ Leonis	5.3	1.93	13.8	- 2 27.0	9 1 20.2	- 0 52.9	+0.7375	0.5034	0.2216	+84	- 1
B. A. C. 4006	6.1	2.00	14.6	4 46.6	12 39.4	+10 7.5	+0.8028	0.5053	0.2196	+85	+ 4
$\eta$ Virginis	5.7	+2.18	-15.6	- 8 54.0	11 33.6	+ 8 22.7	+0.3915	0.5123	-0.2102	+61	-20
75 Virginis	6.0	2.55	16.5	14 50.9	11 17 46.9	-10 17.9	+0.8384	0.5276	0.1857	+75	+ 7
83 Virginis	6.0	2.64	16.5	15 40.6	23 29.9	- 4 45.4	+0.6853	0.5312	0.1793	+74	- 2
85 Virginis	6.5	2.64	16.4	15 15.9	12 0 2.1	- 4 14.3	+0.1468	0.5315	0.1787	+41	-31
B. A. C. 4722	5.8	2.86	16.1	17 44.0	14 18.2	+ 9 34.4	+0.3736	0.5412	0.1603	+52	-19
B. A. C. 4923	7.3	+3.26	-16.1	-20 57.7	18 9 28.7	+ 4 6.4	+1.0102	0.5554	-0.1297	+69	+21
B. A. C. 5254	5.8	3.68	12.2	23 40.8	14 9 53.8	+ 3 39.1	+1.2570	0.5735	0.0808	+66	+52
$\delta$ Scorpii	2.6	3.70	11.3	22 20.2	12 35.6	+ 6 14.9	-0.3520	0.5754	0.0747	+ 3	-62
19 Scorpii	5.1	3.87	10.2	23 55.8	20 56.4	- 9 43.2	+0.7558	0.5809	0.0552	+66	+ 4
$\rho$ Ophiuchi ( <i>S.star</i> )	5.0	3.89	9.5	23 13.0	22 58.2	- 7 45.9	-0.0883	0.5821	0.0503	+14	-45
15 Ophiuchi	7.3	+4.02	- 7.9	-22 59.9	15 6 52.3	- 0 10.2	-0.6332	0.5868	-0.0307	-17	-90
18 Ophiuchi	6.7	4.09	7.9	24 27.9	8 36.1	+ 1 29.4	+0.8258	0.5879	0.0263	+66	+ 9
22 Ophiuchi	6.7	4.09	7.1	23 20.9	10 44.6	+ 3 33.2	-0.3717	0.5889	0.0209	+38	-18
24 Ophiuchi	5.9	4.09	6.8	22 59.5	11 31.5	+ 4 18.2	-0.7530	0.5892	0.0188	-25	-90
B. A. C. 5709	6.3	4.16	7.1	24 56.4	12 44.8	+ 5 28.6	+1.2224	0.5898	0.0157	+65	+47
26 Ophiuchi	6.1	+4.16	- 7.1	-24 50.2	12 49.4	+ 5 33.0	+1.1153	0.5899	-0.0155	+65	+32
39 Ophiuchi ( <i>S.star</i> )	5.5	4.25	5.2	24 10.7	19 53.4	-11 39.6	+0.3952	0.5930	+0.0031	+38	-17
B. A. C. 5831	6.9	4.25	5.1	23 57.8	19 55.7	-11 37.4	+0.1757	0.5931	0.0032	+24	-29
B. A. C. 5846	6.8	4.29	5.0	24 48.3	21 19.3	-10 17.2	+1.0404	0.5936	0.0068	+65	+25
$\theta$ Ophiuchi	3.3	4.30	5.0	24 54.0	21 26.6	-10 10.2	+1.1378	0.5937	0.0072	+65	+35
B. A. C. 5868	7.0	+4.33	- 4.8	-24 9.2	22 40.1	- 8 59.6	+0.3869	0.5941	+0.0105	+38	-18
$\delta$ Ophiuchi	4.4	4.29	4.4	24 5.0	23 10.0	- 8 30.9	+0.3222	0.5943	0.0119	+34	-21
$\epsilon$ Ophiuchi	5.2	4.32	3.7	23 53.1	16 1 8.5	- 6 37.1	+0.1491	0.5950	0.0171	+24	-31
B. A. C. 6066	7.3	4.45	0.7	23 55.5	11 8.2	+ 2 58.3	+0.4930	0.5978	0.0441	+48	-12
4 Sagittarii	5.4	4.46	0.4	23 48.4	12 10.3	+ 3 58.2	+0.4207	0.5981	0.0469	+43	-16
5 Sagittarii	7.0	+4.48	- 0.5	-24 16.6	12 19.0	+ 4 6.5	+0.9007	0.5981	+0.0473	+66	+14
7 Sagittarii	5.9	4.49	- 0.2	24 16.9	13 20.8	+ 5 5.8	+0.9555	0.5982	0.0501	+66	+18
Piazz 17 <sup>h</sup> , 330	5.3	4.46	+ 0.2	23 8.4	13 40.1	+ 5 24.3	-0.1785	0.5983	0.0509	+ 9	-51
9 Sagittarii	6.0	4.50	- 0.1	24 21.8	13 44.4	+ 5 28.5	+1.0574	0.5983	0.0511	+66	+28
Piazz 17 <sup>h</sup> , 334	5.3	4.45	+ 0.3	22 50.4	13 47.3	+ 5 31.3	-0.4756	0.5984	0.0514	- 6	-72
B. A. C. 6161	5.7	+4.51	+ 0.9	-23 43.3	16 47.1	+ 8 23.8	+0.5788	0.5986	+0.0593	+55	- 7
B. A. C. 6336	6.2	4.55	4.3	21 28.8	17 2 55.7	- 5 52.3	-0.9284	0.5996	0.0865	-30	-90
B. A. C. 6343	6.3	4.62	4.0	23 35.4	3 7.5	- 5 41.0	+1.1986	0.5996	0.0870	+66	+41
B. A. C. 6347	6.0	4.54	4.5	21 8.1	3 19.0	- 5 30.0	-1.2408	0.5996	0.0875	-57	-90
28 Sagittarii	5.6	4.62	5.0	22 29.8	6 9.9	- 2 46.0	+0.3813	0.5996	0.0949	+45	-18
30 Sagittarii	6.6	+4.62	+ 5.6	-22 16.6	7 54.4	- 1 5.7	+0.3303	0.5995	+0.0995	+42	-21
31 Sagittarii	7.0	4.62	5.7	22 2.3	8 24.5	- 0 36.8	+0.1431	0.5995	0.1008	+31	-31
33 Sagittarii	6.0	4.61	6.1	21 28.9	9 8.4	+ 0 5.3	-0.3375	0.5993	0.1026	+ 6	-61
$\nu$ Sagittarii	5.0	4.65	5.7	22 52.1	9 10.8	+ 0 7.6	+1.0480	0.5993	0.1028	+67	+25
$\mu$ Sagittarii	5.1	4.66	5.9	22 47.7	9 32.7	+ 0 28.7	+1.0138	0.5993	0.1037	+67	+22
$\xi$ Sagittarii	5.7	+4.60	+ 6.7	-20 47.2	10 26.3	+ 1 20.1	-0.8937	0.5993	+0.1060	-26	-90
$\zeta$ Sagittarii	3.5	4.62	6.6	21 14.3	10 35.0	+ 1 28.4	-0.4294	0.5993	0.1064	+ 1	-67
$\sigma$ Sagittarii	3.8	4.66	7.1	21 53.3	13 15.6	+ 4 2.6	+0.5107	0.5990	0.1131	+54	-11
$\pi$ Sagittarii	3.1	4.65	7.9	21 10.9	15 14.5	+ 5 56.6	+0.0389	0.5987	0.1182	+27	-37
B. A. C. 6707	6.4	4.64	11.2	19 4.3	18 1 38.4	- 8 4.4	-0.6892	0.5968	0.1433	- 9	-90
B. A. C. 6710	5.8	+4.62	+11.4	-18 27.2	1 53.6	- 7 49.9	-1.2652	0.5967	+0.1438	-55	-90
$\zeta$ Sagittarii	5.2	4.69	12.0	20 0.0	5 30.9	- 4 21.3	+0.8000	0.5957	0.1521	+70	+ 6
57 Sagittarii	6.1	4.68	12.7	19 17.9	7 48.7	- 2 8.9	+0.4616	0.5950	0.1572	+55	-14
$\tau_1$ Capricorni	7.0	4.63	17.7	15 29.5	19 1 47.2	- 8 52.9	-0.1196	0.5887	0.1931	+26	-46
$\tau_2$ Capricorni	5.6	4.63	17.9	15 18.3	2 33.8	- 8 8.1	-0.1535	0.5885	0.1950	+25	-48
8 Aquarii	6.8	+4.60	+19.8	-13 26.4	10 56.1	- 0 5.2	-0.2909	0.5850	+0.2083	+19	-57

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	s'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
9 Aquarii	6.8	+4.61	+19.9	-13 55.2	19 11 25.6	+ 0 23.2	+0.2806	0.5849	+0.2092	+50	-24
ν Aquarii	4.7	4.56	20.7	11 46.5	14 53.9	+ 3 43.5	-1.0828	0.5834	0.2141	-27	-90
19 Aquarii	5.2	4.53	21.8	10 10.3	21 20.4	+ 9 55.4	-1.2414	0.5807	0.2226	-42	-90
B. A. C. 7562	5.5	4.50	23.4	9 29.7	20 5 31.7	- 6 11.6	-0.0420	0.5774	0.2317	+35	-42
c Capricorni	5.5	4.50	23.4	9 32.4	5 33.9	- 6 9.5	+0.0109	0.5774	0.2318	+38	-39
c Capricorni	6.4	+4.50	+23.5	- 9 44.1	6 5.5	- 5 39.1	+0.3245	0.5771	+0.2323	+56	-22
30 Aquarii	5.8	4.45	24.5	7 0.2	13 15.6	+ 1 15.1	-0.6570	0.5744	0.2386	+ 3	-85
B. A. C. 7704	7.3	4.44	24.7	6 18.9	15 7.9	+ 3 3.3	-0.8819	0.5737	0.2399	-10	-90
B. A. C. 7717	6.9	4.47	24.8	8 1.0	15 52.9	+ 3 46.6	+0.9608	0.5734	0.2405	+82	+14
44 Aquarii	6.4	4.42	25.1	5 53.1	19 7.8	+ 6 54.4	-0.3391	0.5722	0.2426	+21	-59
51 Aquarii	5.8	+4.41	+25.4	- 5 20.5	22 7.0	+ 9 47.0	-0.1437	0.5712	+0.2442	+31	-47
κ Aquarii	5.2	4.38	25.8	4 44.5	21 3 58.0	- 8 34.6	+0.7061	0.5693	0.2467	+85	- 2
Lalande 44337	6.3	4.37	26.1	4 4.3	5 16.3	- 7 19.2	+0.3713	0.5688	0.2471	+61	-20
3 Piscium	6.4	4.31	26.4	- 0 20.9	13 51.2	+ 0 57.3	-1.1530	0.5664	0.2487	-28	-90
κ Piscium	4.7	4.27	26.7	+ 0 42.6	22 1 18.4	+11 59.9	+0.6493	0.5639	0.2476	+84	- 5
9 Piscium	6.6	+4.27	+26.8	+ 0 34.5	1 26.7	-11 52.1	+0.8169	0.5639	+0.2475	+90	+ 5
16 Piscium	5.8	4.24	26.8	1 32.9	5 27.3	- 7 59.9	+0.8466	0.5631	0.2463	+90	+ 7
19 Piscium	4.9	4.22	26.6	2 56.0	9 50.4	- 3 46.1	+0.5547	0.5624	0.2445	+75	-10
36 Piscium	6.3	4.16	25.7	7 41.2	23 6.8	+ 9 2.3	-0.9740	0.5610	0.2360	+15	-84
d Piscium	5.3	4.15	25.7	7 38.2	23 0 53.3	+10 45.1	+0.5071	0.5609	0.2345	-13	-69
45 Piscium	6.9	+4.14	+25.7	+ 7 8.4	3 8.0	-11 4.9	+0.5129	0.5608	+0.2327	+72	-11
75 Piscium	6.0	4.08	23.4	12 25.3	21 7.5	+ 6 16.7	-0.7737	0.5606	0.2130	- 3	-70
η Piscium	3.7	4.04	21.9	14 49.9	24 8 3.6	- 7 10.2	-0.9759	0.5611	0.1979	-16	-75
101 Piscium	6.3	4.02	21.7	14 9.1	9 56.9	- 5 20.9	+0.0897	0.5614	0.1951	+45	-29
104 Piscium	7.5	4.02	21.6	13 46.7	11 28.5	- 3 52.4	+0.7653	0.5614	0.1927	+90	+ 8
4 Arietis	5.7	+4.02	+20.5	+16 27.5	15 22.0	- 0 7.2	-1.2327	0.5616	+0.1866	-39	-74
26 Arietis	6.0	3.94	17.3	19 24.7	25 9 52.2	- 6 16.3	-1.1248	0.5623	0.1540	-30	-71
B. A. C. 782	7.0	3.91	17.4	18 26.4	11 10.4	- 5 0.8	+0.0803	0.5630	0.1516	-44	-25
μ Arietis	6.0	3.91	16.3	19 35.1	14 58.3	- 1 20.9	-0.5473	0.5632	0.1443	+ 9	-61
47 Arietis	6.0	3.88	15.1	20 16.1	21 46.9	+ 5 13.2	-0.3229	0.5636	0.1308	+22	-45
B. A. C. 920	7.0	+3.89	+14.8	+21 13.2	22 7.5	+ 5 33.0	-1.2723	0.5636	+0.1301	-50	-69
ε Arietis	4.6	3.87	14.8	20 56.4	22 16.4	+ 5 41.7	-0.0614	0.5636	0.1298	-17	-69
ζ Arietis	4.8	3.81	13.8	20 40.4	26 5 5.0	-11 44.4	+0.1521	0.5638	0.1157	+49	-17
τ <sub>1</sub> Arietis	5.0	3.79	13.3	20 47.2	7 49.3	- 9 5.9	+0.3433	0.5638	0.1100	+61	- 6
τ <sub>2</sub> Arietis	5.3	3.78	13.4	20 23.1	8 29.6	- 8 26.9	+0.8396	0.5639	0.1085	+90	+21
65 Arietis	6.0	+3.77	+13.3	+20 26.9	9 13.2	- 7 45.0	+0.8508	0.5638	+0.1070	+90	+22
B. A. C. 1055	6.8	3.80	12.9	21 41.3	9 15.6	- 7 42.7	-0.4482	0.5638	0.1069	+15	-51
66 Arietis	6.0	3.80	12.2	22 27.6	10 55.5	- 6 6.3	-1.0858	0.5638	0.1034	-28	-68
9 Tauri	7.0	3.79	11.4	22 52.8	14 36.9	- 2 32.8	-1.1650	0.5638	0.0954	-37	-67
B. A. C. 1170	6.3	3.75	10.5	23 6.8	19 32.7	+ 2 12.4	-0.9716	0.5637	0.0847	-20	-67
B. A. C. 1189	6.0	+3.71	+10.8	+21 56.5	20 14.7	+ 2 52.9	+0.3290	0.5637	+0.0832	+60	- 5
32 Tauri	6.0	3.69	10.2	22 11.4	23 15.2	+ 5 47.0	+0.3058	0.5635	0.0765	+58	- 6
33 Tauri	6.3	3.71	9.9	22 53.1	23 19.9	+ 5 51.5	-0.4257	0.5635	0.0763	+15	-46
B. A. C. 1238	6.3	3.69	9.6	22 55.2	27 1 0.9	+ 7 29.1	-0.3377	0.5633	0.0726	+20	-40
36 Tauri	6.0	3.70	9.0	23 49.8	2 29.1	+ 8 54.1	-1.2019	0.5632	0.0694	-42	-66
A <sup>1</sup> Tauri	4.6	+3.65	+ 9.7	+21 48.5	2 39.6	+ 9 4.2	+0.9603	0.5632	+0.0690	+90	+33
B. A. C. 1347	7.3	3.63	7.5	24 10.4	10 48.1	- 7 4.5	-1.0730	0.5625	0.0508	-28	-66
62 Tauri	6.0	3.63	7.4	24 4.1	11 1.4	- 6 51.8	-0.9493	0.5624	0.0503	-18	-66
u <sup>1</sup> Tauri	4.7	3.59	7.8	22 35.2	12 3.2	- 5 52.2	+0.6843	0.5623	0.0480	+90	+18
u <sup>2</sup> Tauri	6.0	3.58	7.6	22 46.2	12 29.0	- 5 27.4	+0.5081	0.5622	0.0470	+74	+ 9
τ Tauri	4.5	+3.51	+ 6.4	+22 45.9	19 1.4	+ 0 51.2	+0.7761	0.5612	+0.0324	+90	+25
95 Tauri	6.3	3.53	5.8	23 53.9	19 25.7	+ 1 14.7	-0.4284	0.5612	0.0315	+15	-42
B. A. C. 1463	6.3	3.51	5.8	23 26.7	20 31.4	+ 2 17.9	+0.0932	0.5609	0.0290	+45	-12
99 Tauri	6.0	3.46	4.8	23 47.5	28 1 50.0	+ 7 25.4	-0.1586	0.5599	0.0171	+30	25
103 Tauri	6.0	3.42	3.9	24 8.0	6 22.1	+11 48.0	-0.4720	0.5589	+0.0070	+13	-43
121 Tauri	6.0	+3.29	+ 1.9	+23 58.4	18 31.5	- 0 28.0	-0.3784	0.5557	-0.0196	+18	-38

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i>	<i>d</i>	<i>h</i>	<i>m</i>			<i>°</i>	<i>'</i>
B. A. C. 1801	6.0	+3.24	+ 1.5	+23 9.4	28 22	4.3	+ 2 57.5	+0.4249	0.5546	-0.0272	+68 + 6
132 Tauri	5.3	3.23	0.6	24 32.0	29 0	36.3	+ 5 24.3	-1.1488	0.5529	0.0326	-36 -65
140 Tauri	7.0	3.14	0.3	22 53.6	5	49.3	+10 26.7	+0.4388	0.5519	0.0436	+69 + 5
141 Tauri	6.7	3.12	+ 0.4	22 23.9	6	23.3	+10 59.4	+0.9554	0.5517	0.0447	+90 +35
1 Geminorum	5.0	3.13	- 0.2	23 16.1	7	28.4	-11 57.7	-0.0451	0.5514	0.0470	+37 -21
2 Geminorum	7.2	+3.13	- 0.3	+23 38.9	8	14.2	-11 13.4	-0.4955	0.5511	-0.0486	+11 -49
3 Geminorum	6.3	3.10	0.5	23 7.8	10	2.1	- 9 29.2	-0.0202	0.5504	0.0523	+38 -21
4 Geminorum	7.4	3.10	0.5	23 0.8	10	23.3	- 9 8.7	+0.0877	0.5502	0.0530	+45 -15
6 Geminorum	6.7	3.09	0.6	22 55.9	11	13.3	- 8 20.4	+0.1331	0.5500	0.0547	+47 -13
7 Geminorum	3.5	3.06	0.7	22 32.1	12	24.4	- 7 11.7	+0.4998	0.5495	0.0571	+73 + 7
8 Geminorum	6.5	+3.10	- 1.2	+24 0.1	13	1.9	- 6 35.4	-1.1408	0.5493	-0.0584	-35 -66
9 Geminorum	6.3	3.09	1.2	23 46.5	13	20.3	- 6 17.6	-0.9099	0.5492	0.0589	-15 -66
10 Geminorum	7.0	3.07	1.3	23 38.4	14	13.6	- 5 26.2	-0.8163	0.5489	0.0608	- 8 -66
11 Geminorum	7.3	3.07	1.3	23 30.5	14	25.3	- 5 14.8	-0.6847	0.5488	0.0611	0 -64
12 Geminorum	7.5	3.06	1.2	23 18.9	14	27.1	- 5 13.0	-0.4746	0.5488	0.0612	+13 -48
$\mu$ Geminorum	3.2	+3.03	- 1.3	+22 33.9	16	6.7	- 3 36.0	+0.2430	0.5480	-0.0645	+54 - 8
14 Geminorum	7.2	3.00	1.2	21 42.0	17	24.2	- 2 21.8	+1.1058	0.5476	0.0671	+90 +44
d Geminorum	6.0	2.88	3.2	21 52.7	30	5 26.9	+ 9 17.0	-0.0367	0.5426	0.0901	+37 -25
c Geminorum	4.0	2.80	3.7	20 43.0	11	25.0	- 8 56.5	+0.6730	0.5400	0.1009	+90 +12
56 Geminorum	5.7	2.71	4.9	20 38.0	19	58.3	- 0 39.6	-0.1609	0.5362	0.1157	+30 -35
61 Geminorum	6.0	+2.70	- 5.1	+20 27.5	22	23.3	+ 1 40.7	-0.2521	0.5352	-0.1198	+25 -40
g Geminorum	5.3	2.56	5.9	18 45.3	31	7 48.5	+10 48.1	+0.4327	0.5311	0.1347	+67 - 6
B. A. C. 2658	7.2	2.51	6.7	18 31.2	15	2.2	- 6 11.6	-0.3205	0.5291	0.1454	+22 -48
3 Cancri	6.0	2.49	6.5	17 35.0	15	6.3	- 6 7.6	+0.7086	0.5279	0.1455	+90 + 9
7 Cancri	4.8	+2.46	- 7.3	+17 57.0	20	49.7	- 0 34.7	-0.5533	0.5254	-0.1534	+ 9 -63

SEPTEMBER.

B. A. C. 2810	7.0	+2.41	- 7.9	+17 30.6	1 3 12.0	+ 5 36.1	-1.0699	0.5228	-0.1618	-24	-72
d Cancri	6.0	2.39	8.0	17 22.6	4 45.9	+ 6 9.0	-1.0139	0.5226	0.1625	-19	-73
$\xi$ Leonis	5.3	+2.11	-10.1	+11 44.7	2 14 27.3	- 8 10.3	-1.0549	0.5108	-0.1980	-21	-78
$\lambda$ Leonis	5.7	+2.10	- 9.8	+10 9.5	14 28.8	- 8 8.8	-0.6975	0.5108	-0.1981	+ 1	-80
NEW MOON.											
g Virginis	5.7	+2.03	-13.9	- 8 53.9	6 17 5.0	- 8 18.5	+0.5687	0.5150	-0.2095	+73	- 9
i Virginis	5.7	+2.23	-14.0	-12 11.2	7 20 13.3	- 5 58.6	-1.2605	0.5272	-0.1878	-45	-90
75 Virginis	6.0	2.28	14.5	14 50.9	23 15.6	- 3 1.9	+1.0612	0.5288	0.1847	+75	+23
83 Virginis	6.0	2.34	14.5	15 40.5	8 4 59.4	+ 2 31.4	+0.9159	0.5320	0.1783	+74	+13
85 Virginis	6.5	2.34	14.4	15 15.9	5 31.7	+ 3 2.7	+0.3748	0.5322	0.1776	+54	-19
B. A. C. 4700	5.6	2.48	13.7	15 49.7	17 43.7	- 9 8.5	-1.0889	0.5393	0.1621	-32	-90
B. A. C. 4722	5.8	+2.52	-14.1	-17 44.0	19 52.7	- 7 3.6	+0.6164	0.5407	-0.1591	+68	- 5
B. A. C. 4923	7.3	2.86	14.5	20 57.7	9 15 15.9	+11 40.9	+1.2714	0.5528	0.1284	+69	+50
$\alpha$ Libræ	5.0	2.86	12.1	19 24.8	21 58.9	- 5 50.0	-1.2002	0.5570	0.1162	-49	-90
$\delta$ Scorpii	2.6	3.25	10.0	22 20.2	10 18 54.1	- 9 39.1	-0.0975	0.5694	0.0737	+16	-45
19 Scorpii	5.1	3.41	9.2	23 55.7	11 3 27.6	- 1 24.4	+1.0233	0.5740	0.0545	+66	+24
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	+3.43	- 8.5	-23 13.0	5 32.7	+ 0 36.1	+0.1680	0.5750	-0.0497	+29	-30
15 Ophiuchi	7.3	3.56	6.8	22 59.9	13 40.4	+ 8 25.5	-0.3869	0.5785	0.0305	- 3	-64
18 Ophiuchi	6.7	3.62	7.0	24 27.9	15 32.5	+10 13.5	+1.0895	0.5795	0.0260	+66	+30
22 Ophiuchi	6.7	3.63	6.2	23 20.9	17 39.6	-11 44.2	-0.1234	0.5804	0.0208	+23	-32
24 Ophiuchi	5.9	3.63	5.9	22 59.5	18 28.1	-10 57.6	-0.5105	0.5807	-0.0188	-11	-75
39 Ophiuchi ( <i>S. star</i> )	5.5	+3.80	- 4.5	-24 10.7	12 3 6.0	- 2 39.4	+0.6499	0.5838	+0.0026	+57	- 2
B. A. C. 5831	6.9	3.80	4.5	23 57.8	3 8.4	- 2 37.1	+0.4272	0.5838	0.0027	+40	-15
B. A. C. 5868	7.0	3.87	4.3	24 9.1	5 58.3	+ 0 6.3	+0.6398	0.5846	0.0100	+57	- 3
$\delta$ Ophiuchi	4.4	3.84	3.8	24 5.0	6 29.1	+ 0 35.9	+0.5738	0.5848	0.0111	+51	- 7
$\epsilon$ Ophiuchi	5.2	3.87	3.2	23 53.1	8 31.7	+ 2 33.7	+0.3968	0.5853	0.0163	+39	-17
B. A. C. 6066	7.3	+4.04	- 0.7	-23 55.5	18 52.3	-11 29.7	+0.7385	0.5875	+0.0425	+66	+ 3

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
4 Sagittarii	5.4	+4.05	-0.5	-23 48.5	12 19 56.6	-10 27.8	+0.6638	0.5876	+0.0452	+62	-1
5 Sagittarii	7.0	4.07	0.6	24 16.6	20 5.7	-10 19.1	+1.1516	0.5877	0.0456	+66	+37
7 Sagittarii	5.9	4.08	-0.3	24 16.9	21 9.6	-9 17.7	+1.2063	0.5879	0.0483	+66	+44
Piazz 17 <sup>b</sup> , 330	5.3	4.05	+0.1	23 8.4	21 29.6	-8 58.5	+0.0539	0.5879	0.0492	+22	-36
Piazz 17 <sup>b</sup> , 334	5.3	4.04	0.4	22 50.4	21 37.2	-8 51.1	-0.2481	0.5880	0.0495	+6	-54
B. A. C. 6161	5.7	+4.11	+0.7	-23 43.3	18 0 43.4	-5 52.2	+0.8205	0.5883	+0.0574	+66	+8
14 Sagittarii	6.0	4.06	1.7	21 44.4	1 46.6	-4 51.4	-1.1437	0.5884	0.0600	-49	-90
B. A. C. 6336	6.2	4.18	4.1	21 28.8	11 14.2	+4 14.0	-0.7223	0.5888	0.0537	-17	-90
B. A. C. 6347	6.0	4.17	4.2	21 8.1	11 38.3	+4 37.2	-1.0401	0.5888	0.0847	-38	-90
28 Sagittarii	5.6	4.25	4.6	22 29.8	14 35.4	+7 27.4	+0.6044	0.5887	0.0920	+60	-5
30 Sagittarii	6.6	+4.26	+5.1	-22 16.6	16 23.8	+9 11.6	+0.5507	0.5887	+0.0970	+58	-8
31 Sagittarii	7.0	4.27	5.4	22 2.3	16 55.0	+9 41.6	+0.3598	0.5886	0.0976	+44	-19
33 Sagittarii	6.0	4.26	5.8	21 28.9	17 40.5	+10 25.3	-0.1295	0.5886	0.0995	+17	-47
34 Sagittarii	5.1	4.31	5.4	22 47.8	18 5.6	+10 49.5	+1.2432	0.5886	0.1005	+67	+48
51 Sagittarii	5.7	4.25	6.3	20 47.2	19 1.4	+11 43.1	-0.6962	0.5885	0.1027	-14	-90
52 Sagittarii	3.5	+4.27	+6.2	-21 14.3	19 10.1	+11 51.4	-0.2251	0.5885	+0.1031	+12	-53
o Sagittarii	3.8	4.32	6.6	21 53.3	21 56.6	-9 28.5	+0.7272	0.5883	0.1097	+68	+2
$\pi$ Sagittarii	3.1	4.32	7.4	21 10.9	23 59.8	-7 30.2	+0.2445	0.5881	0.1146	+38	-26
B. A. C. 6707	5.9	4.37	10.8	19 4.4	14 10 45.8	+2 50.9	-0.5125	0.5880	0.1395	0	-73
B. A. C. 6710	5.8	4.35	11.1	18 27.2	11 1.6	+3 6.0	-1.0994	0.5880	0.1401	-37	-90
f Sagittarii	5.2	+4.43	+11.4	-20 0.1	14 46.3	+6 42.0	+0.9946	0.5857	+0.1477	+70	+19
57 Sagittarii	6.1	4.42	12.2	19 17.9	17 8.6	+8 58.9	+0.6464	0.5851	0.1528	+68	-3
$\tau_1$ Capricorni	7.0	4.48	17.5	15 29.5	15 11 40.6	+2 48.6	+0.0211	0.5805	0.1882	+33	-38
$\tau_2$ Capricorni	5.6	4.47	17.7	15 18.3	12 28.4	+3 24.6	-0.0151	0.5803	0.1896	+32	-40
8 Aquarii	6.8	4.49	19.9	13 26.4	21 4.0	+11 50.9	-0.1743	0.5779	0.2033	+25	-49
9 Aquarii	6.8	+4.50	+19.9	-13 55.2	21 34.3	-11 40.0	+0.4042	0.5779	+0.2041	+58	-18
$\nu$ Aquarii	4.7	4.48	21.0	11 46.5	16 1 7.6	-8 14.6	-0.9827	0.5768	0.2092	-20	-90
19 Aquarii	5.8	4.48	22.3	10 10.3	7 42.5	-1 54.3	-1.1579	0.5750	0.2179	-33	-90
B. A. C. 7562	5.5	4.50	24.1	9 29.7	16 3.2	+6 8.0	+0.0333	0.5728	0.2273	+39	-37
c1 Capricorni	5.5	4.50	24.0	9 32.4	16 5.2	+6 9.9	+0.0857	0.5728	0.2273	+41	-35
a Capricorni	6.4	+4.50	+24.1	-9 44.1	16 37.4	+6 40.9	+0.4007	0.5727	+0.2278	+60	-18
30 Aquarii	5.8	4.49	25.5	7 0.2	23 53.7	-10 18.7	-0.6079	0.5710	0.2344	+5	-80
B. A. C. 7704	7.3	4.48	25.9	6 18.9	17 1 47.6	-8 28.8	-0.8387	0.5706	0.2359	-8	-90
B. A. C. 7717	6.9	4.52	25.7	8 1.0	2 33.0	-7 45.1	+1.0120	0.5705	0.2365	+82	+18
44 Aquarii	6.4	4.49	26.4	5 53.0	5 50.1	-4 35.0	-0.3031	0.5698	0.2387	+22	-57
51 Aquarii	5.8	+4.50	+26.7	-5 20.5	8 51.0	-1 40.7	-0.1148	0.5692	+0.2406	+32	-46
$\kappa$ Aquarii	5.2	4.49	27.3	4 44.5	14 44.4	+4 0.0	+0.7214	0.5683	0.2434	+85	-1
Lalande 44337	6.3	4.49	27.9	4 4.2	16 3.2	+5 15.9	+0.3818	0.5680	0.2439	+61	-19
3 Piscium	6.4	4.48	28.6	-0 20.9	18 0 39.6	-10 26.1	-1.1701	0.5670	0.2460	-30	-90
$\kappa$ Piscium	4.7	4.50	29.0	+0 42.6	12 5.4	+0 35.2	+0.6103	0.5661	0.2457	+79	-7
9 Piscium	6.6	+4.50	+29.1	+0 34.5	12 13.7	+0 43.2	+0.7683	0.5661	+0.2457	+90	+2
16 Piscium	5.8	4.50	29.2	1 33.0	16 12.9	+4 34.0	+0.7862	0.5660	0.2448	+90	+3
19 Piscium	4.9	4.51	29.2	2 56.1	20 34.0	+8 45.8	+0.4822	0.5660	0.2436	+69	-14
36 Piscium	6.3	4.52	28.9	7 41.2	19 9 41.3	-2 35.0	-1.0752	0.5663	0.2356	-22	82
d Piscium	5.3	4.53	28.8	7 38.1	11 26.2	-0 53.8	-0.6155	0.5667	0.2344	+7	-77
45 Piscium	6.9	+4.53	+28.8	+7 8.4	13 38.9	+1 14.1	+0.3936	0.5668	+0.2324	+63	-17
75 Piscium	6.0	4.56	27.2	12 25.3	20 7 18.0	-5 44.5	-0.9256	0.5683	0.2136	-11	-78
$\eta$ Piscium	3.7	4.58	25.8	14 49.9	17 59.4	+4 33.8	-1.1444	0.5696	0.1988	-30	-75
101 Piscium	6.3	4.59	25.5	14 9.1	19 49.9	+6 20.3	-0.0962	0.5698	0.1960	+34	-39
104 Piscium	7.5	4.59	25.4	13 46.8	21 19.5	+7 46.5	+0.5696	0.5700	0.1937	+78	-3
27 Arietis	6.3	+4.58	+21.4	+17 15.8	21 19 15.9	+4 55.2	+0.8832	0.5723	+0.1550	+90	+19
B. A. C. 782	7.0	4.60	21.1	18 26.4	20 23.6	+6 0.4	-0.1474	0.5724	0.1525	+31	-37
$\mu$ Arietis	6.0	4.62	20.0	19 35.2	22 0 5.2	+9 33.9	-0.7726	0.5724	0.1453	-4	-70
47 Arietis	6.0	4.61	18.6	20 16.1	6 42.5	-8 3.3	-0.5596	0.5730	0.1317	+8	-60
e Arietis	4.6	4.62	18.3	20 56.5	7 11.2	-7 35.6	-1.1904	0.5730	0.1307	-38	-69
d Arietis	4.0	+4.55	+17.7	+19 21.0	12 26.2	-2 32.3	+1.1101	0.5730	+0.1195	+90	+40

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		"	"	"	d h m	h m				"	"
$\zeta$ Arietis	4.8	+4.57	+17.0	+20 40.5	22 13 48.6	- 1 12.8	-0.0987	0.5731	+0.1165	+34	-31
$\tau_1$ Arietis	5.0	4.56	16.5	20 47.2	16 28.4	+ 1 21.1	+0.0873	0.5731	0.1107	+44	-20
$\tau_2$ Arietis	5.3	4.54	16.5	20 23.1	17 7.5	+ 1 58.8	+0.5763	0.5731	0.1093	+80	+ 6
65 Arietis	6.0	4.54	16.3	20 27.0	17 49.9	+ 2 39.6	+0.5866	0.5731	0.1077	+81	+ 7
B. A. C. 1055	6.8	4.58	16.0	21 41.3	17 52.4	+ 2 42.0	-0.6955	0.5731	0.1077	0	-67
B. A. C. 1143	6.0	+4.50	+14.4	+20 36.8	23 2 17.0	+10 48.1	+1.2518	0.5726	+0.0888	+90	+59
B. A. C. 1170	6.3	4.56	13.2	23 6.9	3 53.0	-11 39.5	-1.2214	0.5724	0.0852	-45	-67
B. A. C. 1189	6.0	4.52	13.5	21 56.5	4 33.8	-11 0.2	+0.0618	0.5724	0.0837	+43	-19
32 Tauri	6.0	4.51	12.7	22 11.4	7 29.8	- 8 10.6	+0.0370	0.5719	0.0769	+41	-20
33 Tauri	6.3	4.53	12.5	22 53.1	7 34.3	- 8 6.3	-0.6853	0.5719	0.0768	0	-65
B. A. C. 1238	6.3	+4.52	+12.1	+22 55.2	9 12.8	- 6 31.3	-0.5997	0.5718	+0.0730	+ 5	-58
A <sup>1</sup> Tauri	4.6	4.47	12.1	21 48.5	10 48.9	- 4 58.7	+0.6808	0.5716	0.0694	+90	+16
62 Tauri	6.0	4.48	9.6	24 4.1	18 58.3	+ 2 53.0	-1.2100	0.5701	0.0505	-44	-66
$\nu^1$ Tauri	4.7	4.43	9.8	22 35.2	19 58.8	+ 3 51.1	+0.4032	0.5700	0.0482	+66	+ 3
$\nu^2$ Tauri	6.0	4.43	9.7	22 46.3	20 24.0	+ 4 15.5	+0.2288	0.5699	0.0472	+53	- 6
$\tau$ Tauri	4.5	+4.39	+ 8.1	+22 45.9	24 2 47.3	+10 24.9	+0.4912	0.5684	+0.0325	+73	+ 9
95 Tauri	6.3	4.42	7.5	23 54.0	3 11.3	+10 48.0	-0.6996	0.5683	0.0316	- 1	-64
B. A. C. 1463	6.3	4.39	7.5	23 26.7	4 15.5	+11 49.9	-0.1846	0.5680	0.0291	+29	-28
99 Tauri	6.0	4.37	6.2	23 47.5	9 27.3	- 7 9.5	-0.4353	0.5665	0.0171	+15	-42
103 Tauri	6.0	4.30	5.1	24 8.0	13 53.9	- 2 52.5	-0.7466	0.5651	+0.0070	- 4	-66
121 Tauri	6.0	+4.17	+ 2.5	+23 58.4	25 1 50.0	+ 8 38.2	-0.6557	0.5607	-0.0196	+ 2	-59
B. A. C. 1801	6.0	4.10	1.9	23 9.5	5 19.4	-11 59.7	+0.1397	0.5593	0.0272	+48	- 9
NEPTUNE				22 8.6	9 42.8	- 7 45.4	+1.0951	0.5572	0.0366	+90	+46
140 Tauri	7.0	4.01	0.4	22 53.6	12 57.4	- 4 37.6	+0.1544	0.5559	0.0435	+48	-10
141 Tauri	6.7	3.99	+ 0.4	22 23.9	13 30.9	- 4 5.3	+0.6668	0.5557	0.0447	+90	+17
1 Geminorum	5.0	+4.00	- 0.2	+23 16.1	14 35.2	- 3 3.2	-0.3249	0.5552	-0.0469	+21	-37
2 Geminorum	7.2	4.00	0.4	23 38.9	15 20.3	- 2 19.7	-0.7712	0.5549	0.0485	- 6	-66
3 Geminorum	6.3	3.96	0.6	23 7.8	17 6.8	- 0 36.8	-0.2996	0.5540	0.0522	+22	-36
4 Geminorum	7.4	3.96	0.6	23 0.8	17 27.7	- 0 16.6	-0.1926	0.5539	0.0529	+28	-30
6 Geminorum	6.7	3.95	0.7	22 55.9	18 17.0	+ 0 31.0	-0.1472	0.5535	0.0546	+31	-28
7 Geminorum	3.5	+3.92	- 0.8	+22 32.1	19 27.2	+ 1 38.8	+0.2159	0.5529	-0.0569	+52	- 8
9 Geminorum	6.3	3.95	1.5	23 46.5	20 22.5	+ 2 32.2	-1.1814	0.5525	0.0588	-40	-66
10 Geminorum	7.0	3.93	1.8	23 38.4	21 15.1	+ 3 23.0	-1.0882	0.5521	0.0606	-30	-66
11 Geminorum	7.3	3.93	1.7	23 30.5	21 26.7	+ 3 34.2	-0.9577	0.5520	0.0610	-18	-66
12 Geminorum	7.5	3.92	1.7	23 18.9	21 28.4	+ 3 35.9	-0.7492	0.5520	0.0610	- 4	-67
$\mu$ Geminorum	3.2	+3.88	- 1.7	+22 33.9	23 7.0	+ 5 11.1	-0.0370	0.5513	-0.0643	+37	-23
14 Geminorum	7.2	3.84	1.9	21 42.0	26 0 23.6	+ 6 25.2	+0.8198	0.5506	0.0669	+90	+24
$\delta$ Geminorum	6.0	3.70	4.1	21 52.7	12 19.2	- 6 3.2	-0.3088	0.5446	0.0897	+22	-41
$\zeta$ Geminorum	4.0	3.61	4.7	20 43.0	18 14.5	- 0 19.5	+0.4003	0.5415	0.1003	+65	- 4
56 Geminorum	5.7	3.49	6.3	20 38.0	27 2 44.6	+ 7 54.2	-0.4224	0.5372	0.1149	+16	-51
61 Geminorum	6.0	+3.46	- 6.6	+20 27.4	5 8.8	+10 13.7	-0.5110	0.5359	-0.1188	+11	-56
8 Geminorum	5.3	3.30	7.5	18 45.3	14 31.7	- 4 41.1	+0.1785	0.5312	0.1335	+50	-19
B. A. C. 2658	7.2	3.22	8.5	18 31.2	21 44.2	+ 2 18.0	-0.5636	0.5278	0.1440	+ 8	-63
3 Cancri	6.0	3.21	8.3	17 35.0	21 48.3	+ 2 22.0	+0.4617	0.5277	0.1441	+69	- 5
$\gamma^1$ Cancri	4.8	3.15	9.3	17 57.0	28 3 30.9	+ 7 54.1	-0.7885	0.5251	0.1519	- 5	-72
B. A. C. 2810	7.0	+3.07	-10.0	+17 30.5	9 52.8	- 9 55.6	-1.2957	0.5223	-0.1600	-51	-72
$\delta^2$ Cancri	6.0	3.05	10.0	17 22.6	10 26.6	- 9 22.8	-1.2392	0.5220	0.1607	-42	-73
$\xi$ Leonis	5.3	2.62	12.2	11 44.6	29 21 7.5	+ 0 17.5	-1.2235	0.5102	0.1958	-37	-78
$\delta$ Leonis	5.7	2.61	12.5	10 9.5	21 8.9	+ 0 18.9	+0.5322	0.5102	0.1958	+73	- 8
$\theta$ Leonis	3.8	2.58	12.2	10 20.9	30 2 5.1	+ 5 6.5	-0.6552	0.5091	0.1995	+ 4	-78
10 Sextantis	6.0	+2.48	-12.6	+ 9 24.5	10 20.3	-10 52.1	-1.2785	0.5076	-0.2050	-42	-81
11 Sextantis	6.0	2.48	12.5	8 47.6	11 15.4	- 9 58.7	-0.7870	0.5074	0.2055	- 4	-81
$\pi$ Leonis	5.0	2.46	12.6	8 31.5	12 23.7	- 8 52.3	-0.7248	0.5073	0.2062	0	-81
14 Sextantis	6.6	2.42	12.3	6 6.0	15 59.2	- 5 22.8	+1.2195	0.5068	0.2083	+90	+36
16 Sextantis	6.9	+2.42	-12.5	+ 6 39.7	17 19.0	- 4 5.3	+0.3189	0.5067	-0.2090	+58	-21

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	$d$ $h$ $m$	$h$ $m$				$\alpha$	$\delta$
34 Sextantis	6.7	+2.28	-13.1	+ 4 6.4	1 11 32.4	-10 22.3	-0.7319	0.5058	-0.2163	0	-84
36 Sextantis	6.6	2.27	13.0	3 0.9	12 55.7	- 9 1.4	+0.1748	0.5058	0.2167	+49	-29
55 Leonis	6.2	2.23	13.0	1 16.3	18 41.3	- 3 25.3	+0.8497	0.5061	0.2180	+90	+ 7
57 Leonis	6.9	2.23	13.0	0 58.1	18 57.2	- 3 9.9	+1.1273	0.5061	0.2181	+90	+26
$\rho^3$ Leonis	5.4	2.20	13.1	0 32.4	23 0.6	+ 0 46.8	+0.1740	0.5064	0.2187	+90	- 1
$\rho^4$ Leonis	5.7	+2.18	-13.3	+ 0 28.6	2 4 32.2	+ 6 9.1	-0.4271	0.5071	-0.2193	+17	-65
$\epsilon$ Leonis	5.3	+2.14	-13.3	- 2 27.0	13 31.1	- 9 7.1	+0.8261	0.5085	-0.2192	+88	+ 6
NEW MOON.											
B. A. C. 4700	5.6	+2.31	-12.3	-15 49.7	5 23 18.8	- 1 46.1	-0.9190	0.5439	-0.1614	-20	-90
B. A. C. 4722	5.8	+2.33	-12.4	-17 44.0	6 1 26.5	+ 0 17.5	+0.7854	0.5451	-0.1584	+72	+ 5
$\alpha$ Libræ	5.0	2.57	10.5	19 24.7	7 3 20.4	+ 1 18.9	-0.9887	0.5602	0.1153	-30	-90
$\beta$ Libræ	6.5	2.58	10.4	19 16.2	3 49.8	+ 1 47.3	-1.1961	0.5605	0.1144	-49	-90
$\delta$ Scorpii	2.6	2.86	8.5	22 20.2	8 0 12.8	- 2 33.2	+0.1388	0.5710	0.0727	+29	-31
19 Scorpii	5.1	3.00	7.7	23 55.7	8 47.5	+ 5 42.7	+1.2707	0.5746	0.0535	+66	+59
$\rho$ Ophiuchi ( <i>S.star</i> )	5.0	+3.00	- 7.2	-23 13.0	10 53.1	+ 7 43.8	+0.4146	0.5754	-0.0487	+43	-16
15 Ophiuchi	7.3	3.11	5.6	22 59.8	19 3.7	- 8 23.9	-0.1364	0.5781	0.0296	+10	-47
22 Ophiuchi	6.7	3.18	5.1	23 20.9	23 5.0	- 4 31.5	+0.1309	0.5733	0.0200	+24	-31
24 Ophiuchi	5.9	3.18	4.8	22 59.5	23 53.9	- 3 44.5	-0.2578	0.5795	-0.0180	+ 2	-55
39 Ophiuchi ( <i>S.star</i> )	5.5	3.32	3.7	24 10.7	9 8 37.4	+ 4 39.4	+0.9145	0.5815	+0.0031	+66	+16
B. A. C. 5831	6.9	+3.32	- 3.6	-23 57.8	8 39.9	+ 4 41.8	+0.6902	0.5814	+0.0032	+61	+ 1
B. A. C. 5868	7.0	3.39	3.4	24 9.1	11 31.9	+ 7 27.3	+0.9062	0.5819	0.0103	+66	+15
$\delta$ Ophiuchi	4.4	3.37	3.0	24 5.0	12 3.3	+ 7 57.5	+0.8398	0.5820	0.0115	+66	+10
$\alpha$ Ophiuchi	5.2	3.39	2.5	23 53.1	14 7.6	+ 9 57.0	+0.6625	0.5823	0.0166	+60	- 1
B. A. C. 6066	7.3	3.52	0.3	23 55.5	10 0 38.4	- 3 56.2	+1.0108	0.5831	0.0424	+66	+23
4 Sagittarii	5.4	+3.55	- 0.1	-23 48.4	1 44.0	- 2 53.0	+0.9361	0.5831	+0.0451	+66	+17
Piazzi 17 <sup>b</sup> , 330	5.3	3.55	+ 0.5	23 8.4	3 18.8	- 1 21.9	+0.3208	0.5833	0.0490	+37	-21
Piazzi 17 <sup>b</sup> , 334	5.3	3.54	0.6	22 50.4	3 26.5	- 1 14.4	+0.0159	0.5831	0.0493	+20	-38
B. A. C. 6161	5.7	3.61	0.9	23 43.3	6 36.4	+ 1 48.2	+1.0948	0.5830	0.0569	+66	+30
14 Sagittarii	6.0	3.56	1.9	21 41.4	7 41.0	+ 2 50.4	-0.8884	0.5830	0.0596	-29	-90
B. A. C. 6336	6.2	+3.69	+ 4.0	-21 28.8	17 21.6	-11 51.1	-0.4638	0.5823	+0.0830	- 3	-70
B. A. C. 6347	6.0	3.68	4.2	21 8.1	17 46.3	-11 27.4	-0.7854	0.5822	0.0836	-20	-90
28 Sagittarii	5.6	3.76	4.1	22 29.9	20 47.9	- 8 32.7	+0.8781	0.5819	0.0907	+68	+12
30 Sagittarii	6.6	3.77	5.0	22 16.6	22 39.1	- 6 45.7	+0.8234	0.5817	0.0950	+68	+ 9
31 Sagittarii	7.0	3.78	5.3	22 2.3	23 11.1	- 6 14.9	+0.6299	0.5816	0.0961	+62	- 3
33 Sagittarii	6.0	+3.78	+ 5.7	-21 28.9	23 57.7	- 5 30.1	+0.1343	0.5815	+0.0980	+31	-31
$\zeta^1$ Sagittarii	5.7	3.77	5.9	20 47.2	11 1 20.9	- 4 9.9	-0.4397	0.5812	0.1011	+ 1	-68
$\zeta^2$ Sagittarii	3.5	3.78	5.8	21 14.3	1 29.9	- 4 1.3	+0.0374	0.5812	0.1015	+26	-37
$\sigma$ Sagittarii	3.8	3.84	6.3	21 53.3	4 20.8	- 1 16.8	+1.0008	0.5806	0.1079	+68	+21
$\pi$ Sagittarii	3.1	3.84	7.0	21 10.9	6 27.6	+ 0 45.2	+0.5113	0.5862	0.1126	+55	-11
$d$ Sagittarii	5.0	+3.83	+ 8.5	-19 7.8	9 44.8	+ 3 55.0	-1.2036	0.5796	+0.1198	-49	-90
B. A. C. 6658	7.3	3.86	9.6	18 33.6	14 5.3	+ 8 5.7	-1.2427	0.5785	0.1291	-53	-90
B. A. C. 6707	6.4	3.91	10.2	19 4.4	17 33.0	+11 25.7	-0.2602	0.5777	0.1363	+14	-55
B. A. C. 6710	5.8	3.90	10.5	18 27.2	17 49.2	+11 41.2	-0.8547	0.5776	0.1365	-20	-90
$f$ Sagittarii	5.2	3.97	10.7	20 0.1	21 41.1	- 8 35.5	+1.2646	0.5766	0.1447	+70	+48
57 Sagittarii	6.1	+3.98	+11.2	-19 17.9	12 0 8.1	- 6 14.0	+0.9099	0.5760	+0.1495	+71	+14
$\gamma$ Capricorni	7.0	4.09	16.7	15 29.6	19 17.9	-11 46.4	+0.2560	0.5705	0.1836	+46	-25
$\gamma$ Capricorni	5.6	4.09	16.9	15 18.3	20 7.5	-10 58.6	+0.2191	0.5702	0.1849	+45	-27
8 Aquarii	6.8	4.14	19.1	13 26.4	18 5 1.2	- 2 24.2	+0.0444	0.5678	0.1982	+36	-37
9 Aquarii	6.8	4.16	19.0	13 55.2	5 32.6	- 1 53.9	+0.6317	0.5676	0.1989	+73	- 5
$\nu$ Aquarii	4.7	+4.15	+20.3	-11 46.5	9 13.3	+ 1 38.9	-0.7839	0.5667	+0.2039	-10	-90
19 Aquarii	5.8	4.18	21.7	10 10.3	16 2.2	+ 8 13.2	-0.9726	0.5650	0.2123	-19	-90
B. A. C. 7562	5.5	4.23	23.4	9 29.7	14 0 40.0	- 7 27.3	+0.2216	0.5632	0.2215	+49	-27
$\alpha^1$ Capricorni	5.5	4.23	23.4	9 32.4	0 42.1	- 7 25.3	+0.2749	0.5632	0.2215	+52	-24
$\alpha^2$ Capricorni	6.4	4.24	23.4	9 44.1	1 15.4	- 6 53.2	+0.5940	0.5631	0.2220	+74	- 7
30 Aquarii	5.8	+4.26	+25.1	- 7 0.2	8 46.2	+ 0 21.7	-0.4454	0.5618	+0.2285	+14	-67

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
B. A. C. 7704	7.3	+4.27	+25.5	- 6 18.9	14 10 43.7	+ 2 15.2	-0.6842	0.5616	+0.2300	+ 1	-88
B. A. C. 7717	6.9	4.30	25.1	8 1.0	11 30.6	+ 3 0.4	+1.1949	0.5615	0.2305	+82	+33
44 Aquarii	6.4	4.30	26.1	5 53.0	14 53.9	+ 6 16.6	-0.1493	0.5610	0.2328	+30	-47
51 Aquarii	5.8	4.31	26.5	5 20.5	18 0.3	+ 9 16.5	+0.0346	0.5607	0.2346	+40	-37
κ Aquarii	5.2	4.35	27.3	4 44.5	15 0 4.2	- 8 52.3	+0.8686	0.5602	0.2376	+85	+ 8
Lalande 44337	6.3	+4.35	+27.6	- 4 4.2	1 25.3	- 7 34.1	+0.5212	0.5602	+0.2381	+71	-11
3 Piscium	6.4	4.38	29.0	- 0 20.9	10 15.5	+ 0 57.8	-1.0733	0.5600	0.2405	-22	-90
κ Piscium	4.7	4.47	29.5	+ 0 42.6	21 57.4	-11 44.8	+0.6892	0.5606	0.2407	+88	- 2
9 Piscium	6.6	4.47	29.5	0 34.5	22 5.9	-11 36.6	+0.8579	0.5606	0.2407	+90	+ 8
16 Piscium	5.8	4.49	30.0	1 33.0	16 2 9.9	- 7 40.9	+0.8640	0.5608	0.2398	+90	+ 8
19 Piscium	4.9	+4.52	+30.2	+ 2 56.1	6 36.0	- 3 24.1	+0.5450	0.5614	+0.2385	+74	-10
36 Piscium	6.3	4.62	30.6	7 41.3	19 55.0	+ 8 26.9	-1.0619	0.5635	0.2317	-22	-82
d Piscium	5.3	4.63	30.6	7 38.3	21 41.2	+11 9.4	-0.6031	0.5636	0.2305	+ 7	-76
45 Piscium	6.9	4.64	30.4	7 8.5	23 55.3	-10 41.3	+0.4063	0.5644	0.2288	+64	-16
75 Piscium	6.0	4.79	29.4	12 25.4	17 17 41.4	+ 6 27.0	-0.9662	0.5685	0.2111	-16	-78
η Piscium	3.7	+4.88	+28.2	+14 50.0	18 4 23.0	- 7 14.5	-1.2114	0.5713	+0.1968	-37	-75
101 Piscium	6.3	4.89	27.8	14 9.2	6 13.4	- 5 28.1	-0.1663	0.5718	0.1941	+30	-42
104 Piscium	7.5	4.91	27.6	13 46.8	7 42.5	- 4 2.1	+0.4958	0.5722	0.1919	+71	- 7
27 Arietis	6.3	5.04	23.8	17 15.8	19 5 29.7	- 7 2.9	+0.7550	0.5771	0.1539	+90	+12
B. A. C. 782	7.0	5.07	23.6	18 26.5	6 36.6	- 5 58.5	-0.2747	0.5773	0.1518	+24	-44
μ Arietis	6.0	+5.12	+22.5	+19 35.2	10 15.6	- 2 27.6	-0.9048	0.5780	+0.1445	-13	-70
47 Arietis	6.0	5.15	21.0	20 16.2	16 47.6	+ 3 49.9	-0.7056	0.5789	0.1310	- 1	-69
δ Arietis	4.0	5.13	19.9	19 21.0	22 26.3	+ 9 15.9	+0.9440	0.5794	0.1188	+90	+27
ζ Arietis	4.8	5.16	19.3	20 40.5	23 47.3	+10 33.9	-0.2593	0.5795	0.1159	+25	-40
η Arietis	5.0	5.16	18.7	20 47.3	20 2 24.5	-10 54.7	-0.0807	0.5797	0.1101	+34	-29
τ Arietis	5.3	+5.15	+18.8	+20 23.2	3 3.1	-10 17.5	+0.4042	0.5797	+0.1087	+65	- 4
65 Arietis	6.0	5.15	18.4	20 27.0	3 44.7	- 9 37.5	+0.4130	0.5797	0.1071	+66	- 3
B. A. C. 1055	6.8	5.19	18.3	21 41.4	3 47.1	- 9 35.2	-0.8609	0.5797	0.1070	-11	-68
B. A. C. 1143	6.0	5.16	16.3	20 36.9	12 2.8	- 1 38.0	+1.0579	0.5797	0.0882	+90	+39
B. A. C. 1189	6.0	5.19	15.4	21 56.5	14 17.1	+ 0 31.2	-0.1269	0.5796	0.0830	+32	-30
32 Tauri	6.0	+5.20	+14.6	+22 11.5	17 9.8	+ 3 17.5	-0.1562	0.5794	+0.0763	+30	-30
33 Tauri	6.3	5.22	14.4	22 53.2	17 14.2	+ 3 21.7	-0.8732	0.5794	0.0762	-12	-67
B. A. C. 1238	6.3	5.21	14.0	22 55.3	18 50.8	+ 4 54.8	-0.7905	0.5792	0.0724	- 7	-67
A <sup>1</sup> Tauri	4.6	5.19	13.8	21 48.6	20 25.1	+ 6 25.5	+0.4773	0.5790	0.0687	+71	+ 5
A <sup>2</sup> Tauri	6.3	5.18	13.7	21 44.4	20 41.0	+ 6 40.8	+0.5675	0.5790	0.0681	+79	+ 9
56 Tauri	5.0	+5.15	+12.2	+21 32.0	21 2 37.8	-11 35.7	+1.1505	0.5780	+0.0540	+90	+50
χ <sup>1</sup> Tauri	4.7	5.16	11.4	22 4.0	5 1.1	- 9 17.7	+0.7162	0.5777	0.0484	+90	+20
χ <sup>2</sup> Tauri	6.3	5.16	11.4	21 58.3	5 2.4	- 9 16.5	+0.8155	0.5777	0.0483	+90	+26
ψ <sup>1</sup> Tauri	4.7	5.18	11.2	22 35.3	5 24.1	- 8 55.6	+0.1883	0.5775	0.0474	+50	- 9
ψ <sup>2</sup> Tauri	6.0	5.17	11.1	22 46.3	5 48.8	- 8 31.8	+0.0149	0.5775	0.0465	+40	+18
τ Tauri	4.5	+5.14	+ 9.2	+22 45.9	12 4.1	- 2 30.4	+0.2661	0.5760	+0.0317	+55	- 3
95 Tauri	6.3	5.17	8.8	23 54.0	12 27.6	- 2 7.8	-0.9144	0.5759	0.0307	-16	-66
B. A. C. 1463	6.3	5.15	8.7	23 26.7	13 30.6	- 1 7.1	-0.4054	0.5756	0.0283	+16	-41
99 Tauri	6.0	5.14	7.1	23 47.6	18 35.9	+ 3 47.0	-0.6601	0.5753	0.0162	+ 1	-59
103 Tauri	6.0	5.12	5.8	24 8.0	22 57.0	+ 7 58.5	-0.9746	0.5726	+0.0061	-20	-66
121 Tauri	6.0	+5.01	+ 2.7	+23 58.4	22 10 38.5	- 4 45.5	-0.8960	0.5679	-0.0206	-14	-66
B. A. C. 1801	6.0	4.96	+ 1.8	23 9.5	14 3.8	- 1 27.5	-0.1112	0.5663	0.0283	+33	-23
NEPTUNE				22 7.5	18 5.5	+ 2 25.6	+0.8620	0.5653	0.0375	+90	+30
140 Tauri	7.0	4.88	0.0	22 53.6	21 32.9	+ 5 45.7	-0.1032	0.5625	0.0447	+33	-24
141 Tauri	6.7	4.86	0.0	22 23.9	22 5.8	+ 6 17.4	+0.4041	0.5622	0.0458	+65	+ 3
1 Geminorum	5.0	+4.87	- 0.7	+23 16.1	23 8.9	+ 7 18.3	-0.5794	0.5617	-0.0481	+ 6	-55
2 Geminorum	7.2	4.87	0.9	23 38.8	23 53.1	+ 8 0.9	-1.0253	0.5613	0.0496	-24	-66
3 Geminorum	6.3	4.84	1.2	23 7.8	28 1 37.6	+ 9 41.9	-0.5563	0.5604	0.0533	+ 7	-54
4 Geminorum	7.4	4.84	1.3	23 0.8	1 58.2	+10 1.7	-0.4505	0.5602	0.0540	+14	-46
6 Geminorum	6.7	4.82	1.4	22 55.9	2 46.6	+10 48.4	-0.4061	0.5597	0.0557	+16	-43
η Geminorum	3.5	+4.80	- 1.6	+22 32.1	3 55.5	+11 54.9	-0.0462	0.5592	-0.0581	+35	-23



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	d h m	h m				$\alpha$	$\delta$
11 Geminorum	7.3	+4.81	-2.4	+23 30.5	28 5 52.9	-10 11.7	-1.2118	0.5580	-0.0621	-44	-66
12 Geminorum	7.5	4.80	2.4	23 18.9	5 54.6	-10 10.0	-1.0052	0.5580	0.0622	-22	-67
$\mu$ Geminorum	3.2	4.77	2.6	22 33.9	7 31.4	-8 36.7	-0.3001	0.5569	0.0654	+22	-38
14 Geminorum	7.2	4.73	2.6	21 42.0	8 46.6	-7 24.0	+0.5481	0.5564	0.0680	+77	+9
$\delta$ Geminorum	6.0	4.59	5.6	21 52.7	20 30.6	+3 56.1	+0.5768	0.5495	0.0906	+7	-58
$\zeta$ Geminorum	4.0	+4.48	-6.5	+20 43.0	24 2 20.8	+9 34.6	+0.1241	0.5460	-0.1010	+46	-18
56 Geminorum	5.7	4.37	8.3	20 37.9	10 44.1	-6 18.6	-0.6949	0.5410	0.1156	0	-69
61 Geminorum	6.0	4.34	8.7	20 27.4	13 6.5	-4 0.8	-0.7834	0.5396	0.1195	-6	-70
$f$ Geminorum	6.0	4.19	9.2	17 54.1	19 10.6	+1 51.7	+1.2560	0.5360	0.1291	+90	+54
$g$ Geminorum	5.3	4.16	10.1	18 45.2	22 23.3	+4 58.2	-0.0986	0.5341	0.1339	+33	-34
B. A. C. 2658	7.2	+4.07	-11.3	+18 31.2	25 5 31.9	+11 53.4	-0.8361	0.5300	-0.1442	-9	-71
3 Cancri	6.0	4.05	11.0	17 34.9	5 35.9	+11 57.3	+0.1833	0.5300	0.1443	+50	-20
$\zeta$ Cancri	4.8	3.98	12.2	17 56.9	11 15.9	-6 33.1	-1.0593	0.5269	0.1519	-24	-72
$\alpha^1$ Cancri	4.0	3.57	13.7	12 14.7	26 11 1.5	-7 30.3	+1.2867	0.5157	0.1790	+90	+50
$\lambda$ Leonis	5.7	3.32	15.1	10 9.4	27 4 45.6	+9 43.3	+0.2823	0.5096	0.1943	+56	-21
$\sigma$ Leonis	3.8	+3.27	-15.7	+10 20.8	9 41.7	-9 29.1	-0.8967	0.5082	-0.1979	-11	-80
11 Sextantis	6.0	3.16	16.1	8 47.5	18 52.5	-0 33.8	-1.0177	0.5063	0.2037	-19	-81
$\pi$ Leonis	5.0	3.14	16.1	8 31.5	20 0.7	+0 32.5	-0.9537	0.5059	0.2043	-14	-81
14 Sextantis	6.6	3.08	15.6	6 6.0	23 36.6	+4 2.4	+0.9919	0.5056	0.2063	+90	+18
16 Sextantis	6.9	3.07	15.9	6 39.7	28 0 56.4	+5 19.9	+0.0952	0.5055	0.2070	+44	-33
34 Sextantis	6.7	+2.87	-16.2	+4 6.4	19 11.5	-0 55.4	-0.9265	0.5045	-0.2141	-12	-86
36 Sextantis	6.6	2.86	16.1	3 0.9	20 34.9	+0 25.6	-0.0166	0.5046	0.2144	+38	-39
55 Leonis	6.2	2.81	15.9	1 16.2	29 2 20.9	+6 2.0	+0.6654	0.5048	0.2157	+85	-3
57 Leonis	6.9	2.80	15.9	0 58.0	2 36.8	+6 17.4	+0.9433	0.5049	0.2158	+90	+13
$\rho^1$ Leonis	5.4	2.76	16.0	0 32.3	6 40.4	+10 14.3	+0.5410	0.5053	0.2164	+73	-10
$\rho^2$ Leonis	5.7	+2.72	-16.2	+0 28.5	12 12.1	-8 23.2	-0.5908	0.5061	-0.2170	+7	-78
$\epsilon$ Leonis	5.3	2.65	15.7	-2 27.0	21 11.1	+0 20.6	+0.6774	0.5076	0.2170	+86	-3
B. A. C. 4006	6.1	2.57	15.4	4 46.6	30 8 19.5	+11 10.2	+0.8125	0.5110	0.2155	+85	+5
$\eta$ Virginis	5.7	+2.46	-14.7	-8 54.0	31 6 47.1	+8 58.7	+0.5521	0.5202	-0.2069	+71	-9

NOVEMBER.

				NEW	MOON.						
$\delta$ Scorpii	6.2	+2.73	-7.3	-22 20.2	4 6 26.3	+5 27.9	+0.2538	0.5774	-0.0719	+35	-24
MERCURY				-22 50.9	8 5.1	+7 3.0	+0.6785	0.5202	-0.0532	+64	+1
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	+2.82	-5.9	23 13.0	16 55.6	-8 26.2	+0.5437	0.5818	0.0477	+52	-8
15 Ophiuchi	7.3	2.89	4.5	22 59.8	5 0 58.1	-0 42.0	+0.0077	0.5845	0.0285	+17	-39
22 Ophiuchi	6.7	2.93	3.8	23 20.9	4 55.6	+3 6.5	+0.2786	0.5854	0.0188	+32	-23
24 Ophiuchi	5.9	2.93	3.7	22 59.4	5 43.7	+3 52.7	-0.1066	0.5855	-0.0166	+10	-45
39 Ophiuchi ( <i>S. star</i> )	5.5	+3.02	-2.5	-24 10.7	14 19.8	-11 50.8	+1.0700	0.5870	+0.0044	+66	+29
B. A. C. 5831	6.9	3.03	2.5	23 57.7	14 22.3	-11 48.4	+0.8471	0.5871	0.0055	+66	+11
B. A. C. 5868	7.0	3.08	2.2	24 9.1	17 12.0	-9 5.3	+1.0652	0.5873	0.0116	+66	+28
$\delta$ Ophiuchi	4.4	3.06	2.0	24 5.0	17 42.9	-8 35.6	+1.0001	0.5873	0.0129	+66	+23
SATURN				22 5.4	18 46.6	-7 34.4	-1.0492	0.5840	0.0159	-45	-90
$\alpha$ Ophiuchi	5.2	+3.07	-1.5	-23 53.1	19 45.7	-6 37.6	+0.8261	0.5880	+0.0180	+66	+10
52 Ophiuchi	6.5	3.04	-0.8	21 58.6	21 22.3	-5 4.6	-1.1154	0.5876	0.0220	-49	-90
B. A. C. 6066	7.3	3.18	+0.4	23 55.5	6 9.7	+3 22.5	+1.1853	0.5874	0.0438	+66	+41
4 Sagittarii	5.4	3.19	0.7	23 48.4	7 14.7	+4 25.1	+1.1121	0.5873	0.0464	+66	+33
Piazzi 17 <sup>h</sup> , 330	5.3	3.19	1.1	23 8.4	8 48.5	+5 55.2	+0.5003	0.5872	0.0503	+49	-10
Piazzi 17 <sup>h</sup> , 334	5.3	+3.18	+1.3	-22 50.3	8 56.2	+6 2.7	+0.1966	0.5872	+0.0506	+30	-28
14 Sagittarii	6.0	3.19	2.3	21 44.4	13 8.7	+10 5.5	-0.7009	0.5867	0.0608	-18	-90
B. A. C. 6336	6.2	3.28	4.3	21 28.8	22 45.6	-4 39.6	-0.2702	0.5849	0.0837	+7	-56
B. A. C. 6347	6.0	3.29	4.3	21 8.1	23 10.5	-4 15.8	-0.5909	0.5848	0.0847	-9	-82
28 Sagittarii	5.6	3.35	4.7	22 29.8	7 2 11.3	-1 21.9	+1.0731	0.5840	0.0917	+68	+28
B. A. C. 6386	7.3	+3.30	+5.4	-20 23.0	2 51.2	-0 43.5	-1.0341	0.5838	+0.0932	-37	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	X	Y	N. S.
		Δα	Δδ							
		s	"	°	d h m	h m				°
29 Sagittarii	5.5	+3.31	+ 5.5	-20 26.3	7 3 35.3	- 0 1.1	-0.9080	0.5836	+0.0949	-27 -90
30 Sagittarii	6.6	3.36	5.1	22 16.6	4 2.3	+ 0 24.9	+1.0201	0.5835	0.0959	+68 +23
31 Sagittarii	7.0	3.36	5.2	22 2.3	4 34.2	+ 0 55.6	+0.8272	0.5834	0.0971	+68 + 9
33 Sagittarii	6.0	3.35	5.6	21 28.9	5 20.8	+ 1 40.4	+0.3324	0.5832	0.0989	+42 -20
ξ <sup>1</sup> Sagittarii	5.7	3.35	6.1	20 47.2	6 43.7	+ 3 0.2	-0.2410	0.5828	0.1020	+11 -54
ξ <sup>2</sup> Sagittarii	3.5	+3.37	+ 5.9	-21 14.3	6 52.8	+ 3 8.9	+0.2365	0.5825	+0.1023	+37 -26
ο Sagittarii	3.8	3.41	6.3	21 53.3	9 43.6	+ 5 53.3	+1.2023	0.5819	0.1086	+68 +41
π Sagittarii	3.1	3.42	6.9	21 11.0	11 50.3	+ 7 55.1	+0.7138	0.5811	0.1133	+69 + 2
δ Sagittarii	5.0	3.40	8.2	19 7.8	15 7.8	+11 5.3	-1.0009	0.5800	0.1203	-31 -90
B. A. C. 6658	7.3	3.44	9.3	18 33.6	19 28.9	- 8 43.5	-1.0390	0.5785	0.1294	-33 -90
B. A. C. 6707	6.4	+3.51	+ 9.9	-19 4.4	22 57.6	- 5 22.4	-0.0528	0.5771	+0.1365	+24 -42
B. A. C. 6710	5.8	3.50	10.2	18 27.2	23 13.8	- 5 6.9	-0.6486	0.5771	0.1370	+ 7 -87
57 Sagittarii	6.1	3.57	11.1	19 17.9	8 5 35.0	+ 1 0.3	+1.1236	0.5746	0.1493	+71 +31
B. A. C. 6992	6.7	3.61	14.7	15 6.0	17 48.8	-11 12.7	-1.1926	0.5696	0.1709	-42 -90
β Capricorni	3.2	3.61	14.7	15 5.8	17 54.8	-11 6.9	-1.1786	0.5695	0.1711	-41 -90
B. A. C. 7087	6.3	+3.65	+16.0	-14 3.8	23 36.6	- 5 37.4	-1.2270	0.5672	+0.1801	-44 -90
γ <sub>1</sub> Capricorni	7.0	3.67	15.7	15 29.6	9 0 57.8	- 4 19.1	+0.4711	0.5666	0.1822	+60 -13
γ <sub>2</sub> Capricorni	5.6	3.67	16.0	15 18.3	1 48.1	- 3 30.6	+0.4328	0.5663	0.1834	+58 -35
8 Aquarii	6.8	3.72	18.0	13 26.4	10 50.9	+ 5 12.9	+0.2562	0.5628	0.1960	+48 -25
9 Aquarii	6.8	3.74	17.9	13 55.2	11 22.8	+ 5 43.7	+0.8483	0.5623	0.1967	+76 + 8
ν Aquarii	4.7	+3.74	+19.2	-11 46.5	15 7.8	+ 9 20.8	-0.5812	0.5612	+0.2014	+ 4 -78
19 Aquarii	5.8	3.77	20.5	10 10.4	22 5.4	- 7 56.2	-0.7753	0.5588	0.2092	- 6 -90
B. A. C. 7562	5.5	3.86	22.2	9 29.7	10 6 55.4	+ 0 35.6	+0.4263	0.5562	0.2179	+62 -16
α <sup>1</sup> Capricorni	5.5	3.85	22.2	9 32.4	6 57.6	+ 0 37.7	+0.4803	0.5562	0.2179	+66 -13
α <sup>2</sup> Capricorni	6.4	3.86	22.2	9 44.2	7 31.7	+ 1 10.6	+0.8036	0.5560	0.2184	+80 + 5
30 Aquarii	5.8	+3.90	+23.9	- 7 0.2	15 14.2	+ 8 37.3	-0.2550	0.5542	+0.2244	+24 -54
B. A. C. 7704	7.3	3.92	24.4	6 18.9	17 14.8	+10 43.8	-0.4989	0.5540	0.2258	+11 -70
B. A. C. 7744	6.7	3.92	24.9	5 12.7	19 32.9	-11 12.8	-1.0938	0.5533	0.2272	-25 -90
B. A. C. 7752	6.7	3.93	25.0	4 56.7	20 3.8	-10 42.9	-1.2465	0.5532	0.2275	-39 -90
44 Aquarii	6.4	3.95	24.9	5 53.1	21 32.0	- 9 7.7	+0.0389	0.5529	0.2284	+40 -37
51 Aquarii	5.8	+3.98	+25.1	- 5 20.5	11 0 43.7	- 6 12.6	+0.2219	0.5525	+0.2301	+51 -27
κ Aquarii	5.2	4.03	26.1	4 44.5	6 58.2	- 0 10.7	+1.0605	0.5516	0.2327	+85 +21
Lalande 44337	6.3	4.04	26.5	4 4.3	8 21.6	+ 1 9.9	+0.7063	0.5516	0.2332	+85 - 1
3 Piscium	6.4	4.11	28.2	- 0 20.9	17 28.0	+ 9 57.0	-0.9216	0.5511	0.2353	-12 -90
κ Piscium	4.7	4.24	28.8	+ 0 42.6	12 5 31.5	- 2 23.0	+0.8485	0.5515	0.2353	+90 + 7
9 Piscium	6.6	+4.24	+28.8	+ 0 34.5	5 40.2	- 2 14.6	+1.0191	0.5515	+0.2350	+90 +19
16 Piscium	5.8	4.28	29.4	1 33.0	9 51.8	+ 1 48.6	+1.0189	0.5518	0.2344	+90 +19
19 Piscium	4.9	4.33	29.7	2 56.1	14 26.0	+ 6 13.6	+0.6875	0.5525	0.2333	+88 - 2
36 Piscium	6.3	4.50	30.6	7 41.3	18 4 8.8	- 4 31.5	-0.9652	0.5549	0.2265	-15 -82
δ Piscium	5.3	4.52	30.6	7 38.3	5 58.0	- 2 46.0	-0.5034	0.5556	0.2253	+12 -68
45 Piscium	6.9	+4.55	+30.3	+ 7 8.5	8 16.0	- 0 32.7	+0.5159	0.5559	+0.2237	+72 -10
75 Piscium	6.0	4.79	30.1	12 25.4	14 2 30.0	- 6 56.5	-0.9079	0.5617	0.2066	-12 -78
7 Piscium	3.7	4.94	29.2	14 50.0	13 26.1	+ 3 36.5	-1.1779	0.5655	0.1929	-34 -75
101 Piscium	6.3	4.97	28.4	14 9.2	15 18.7	+ 5 25.1	-0.1224	0.5661	0.1904	+32 -40
104 Piscium	7.5	4.99	28.1	13 46.8	16 49.6	+ 6 52.9	+0.5435	0.5667	0.1886	+65 - 4
27 Arietis	6.3	+5.26	+24.8	+17 15.8	15 14 57.9	+ 4 13.4	+0.7616	0.5741	+0.1513	+90 +12
B. A. C. 782	7.0	5.31	24.8	18 26.5	16 5.5	+ 5 18.4	-0.2777	0.5745	0.1492	+24 -44
μ Arietis	6.0	5.39	23.9	19 35.3	19 47.0	+ 8 51.8	-0.9180	0.5755	0.1421	-14 -70
47 Arietis	6.0	5.47	22.4	20 16.2	10 2 22.7	- 8 47.0	-0.7284	0.5773	0.1289	- 3 -70
δ Arietis	4.0	5.50	21.0	19 21.0	8 3.7	- 3 18.7	+0.9190	0.5785	0.1170	+90 +26
ζ Arietis	4.8	+5.51	+20.7	+20 40.6	9 25.2	- 2 0.2	-0.2931	0.5788	+0.1140	+22 -41
γ <sub>1</sub> Arietis	5.0	5.54	20.0	20 47.3	12 3.2	+ 0 32.0	-0.1170	0.5792	0.1083	+32 -31
γ <sub>2</sub> Arietis	5.3	5.54	20.0	20 23.2	12 41.9	+ 1 9.3	+0.3676	0.5793	0.1069	+62 - 5
65 Arietis	6.0	5.55	19.7	20 27.0	13 23.8	+ 1 49.6	+0.3766	0.5795	0.1054	+63 - 5
B. A. C. 1055	6.8	5.58	19.7	21 41.4	13 26.2	+ 1 51.9	-0.9021	0.5795	0.1053	-14 -68
B. A. C. 1143	6.0	+5.59	+17.3	+20 36.9	21 43.3	+ 9 50.5	+1.0088	0.5804	+0.0867	+90 +35

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z	y'	N.	S.		
		$\Delta\alpha$	$\Delta\delta$										
B. A. C. 1189	6.0	+5.65	+16.5	+21 56.6	16 23 57.8	+11 59.9	-0.1822	0.5805	+0.0816	+28	-32		
32 Tauri	6.0	5.67	15.6	22 11.5	17 2 50.5	-9 13.8	-0.2161	0.5807	0.0749	+27	-33		
33 Tauri	6.3	5.70	15.7	22 53.2	2 54.9	-9 9.6	-0.9343	0.5807	0.0748	-17	-67		
B. A. C. 1238	6.3	5.70	15.2	22 55.3	4 31.4	-7 36.7	-0.8539	0.5807	0.0710	-11	-67		
A <sup>1</sup> Tauri	4.6	5.67	14.7	21 48.6	6 5.6	-6 6.0	+0.4131	0.5807	0.0674	+66	+1		
A <sup>2</sup> Tauri	6.3	+5.67	+14.6	+21 44.5	6 21.5	-5 50.8	+0.5031	0.5807	+0.0667	+73	+6		
56 Tauri	6.0	5.66	12.9	21 32.0	12 17.4	-0 8.1	+1.0767	0.5804	0.0528	+90	+44		
$\chi^1$ Tauri	4.7	5.69	12.2	22 4.0	14 40.2	+2 9.4	+0.6386	0.5802	0.0471	+88	+16		
$\chi^2$ Tauri	6.3	5.69	12.1	21 58.3	14 41.5	+2 10.6	+0.7379	0.5802	0.0471	+90	+21		
$\psi^1$ Tauri	4.7	5.70	12.0	22 35.3	15 3.1	+2 31.4	+0.1102	0.5801	0.0462	+46	-13		
$\psi^2$ Tauri	6.0	+5.72	+11.9	+22 46.3	15 27.7	+2 55.1	-0.0638	0.5801	+0.0452	+35	-22		
$\tau$ Tauri	4.5	5.72	9.9	22 45.9	21 41.2	+8 54.7	+0.1784	0.5792	0.0305	+50	-8		
95 Tauri	6.3	5.76	9.5	23 54.0	22 4.6	+9 17.2	-1.0016	0.5792	0.0295	-23	-66		
B. A. C. 1463	6.3	5.74	9.3	23 26.7	23 7.1	+10 17.4	-0.4949	0.5789	0.0271	+11	-47		
99 Tauri	6.0	5.76	7.7	23 47.6	18 4 10.4	-8 50.4	-0.7554	0.5778	0.0151	-5	-66		
103 Tauri	6.0	+5.76	+6.3	+24 8.0	8 20.5	-4 41.0	-1.0738	0.5766	+0.0048	-29	-66		
$\pi$ Tauri	5.7	5.65	5.0	21 59.6	13 14.4	-0 6.5	+1.1857	0.5752	-0.0062	+90	+58		
121 Tauri	6.0	5.73	2.6	23 58.4	20 4.3	+6 28.4	-1.0096	0.5725	0.0220	-23	-66		
B. A. C. 1801	6.0	+5.68	+1.5	23 9.4	23 27.3	+9 44.1	-0.2311	0.5711	0.0206	+26	-30		
NEPTUNE				22 6.0	19 2 28.9	-11 21.0	+0.7942	0.5708	0.0362	+90	+26		
140 Tauri	7.0	+5.63	-0.8	+22 53.6	6 51.3	-7 7.9	-0.2288	0.5676	-0.0461	+26	-32		
141 Tauri	6.7	5.61	0.9	22 23.9	7 23.8	-6 36.6	+0.2731	0.5673	0.0472	+56	-5		
1 Geminorum	5.0	5.64	1.4	23 16.1	8 26.1	-5 36.5	-0.7076	0.5668	0.0495	-2	-66		
2 Geminorum	7.2	5.65	1.6	23 38.8	9 9.8	-4 54.4	-1.1494	0.5665	0.0510	-37	-66		
3 Geminorum	6.3	5.62	2.0	23 7.7	10 53.0	-3 14.8	-0.6870	0.5655	0.0526	-1	-64		
4 Geminorum	7.4	+5.61	-2.2	+23 0.8	11 13.7	-2 54.9	-0.3798	0.5653	-0.0555	+6	-56		
6 Geminorum	6.7	5.61	2.3	22 55.9	12 1.2	-2 9.0	-0.5388	0.5649	0.0572	+8	-53		
7 Geminorum	3.5	5.57	2.6	22 32.1	13 9.2	-1 3.4	-0.1816	0.5643	0.0596	+28	-30		
12 Geminorum	7.5	5.61	3.4	23 18.9	15 6.8	+0 50.1	-1.1382	0.5633	0.0636	-35	-67		
$\mu$ Geminorum	3.2	5.56	3.8	22 33.9	16 42.3	+2 22.1	-0.4379	0.5624	0.0669	+15	-47		
14 Geminorum	7.2	+5.52	-3.9	+21 42.0	17 56.6	+3 33.9	+0.4033	0.5617	-0.0695	+65	0		
$\delta$ Geminorum	6.0	5.42	7.3	21 52.7	20 5 31.2	-9 15.4	-0.7250	0.5548	0.0922	-2	-68		
$\zeta$ Geminorum	4.0	5.32	8.6	20 43.0	11 16.8	-3 41.4	-0.0323	0.5512	0.1029	+37	-26		
56 Geminorum	5.7	5.23	10.8	20 37.9	19 33.5	+4 18.8	-0.8538	0.5458	0.1172	-10	-69		
61 Geminorum	6.0	5.20	11.3	20 27.4	21 54.2	+6 34.8	-0.9437	0.5443	0.1211	-17	-70		
f Geminorum	6.0	+5.04	-12.1	+17 54.1	21 3 53.7	-11 37.4	+1.0820	0.5405	-0.1306	+90	+36		
g Geminorum	5.3	5.03	13.1	18 45.2	7 4.1	-8 33.1	-0.2681	0.5385	0.1354	+24	-43		
B. A. C. 2658	7.2	4.95	14.5	18 31.1	14 7.7	-1 43.0	-1.0062	0.5340	0.1456	-20	-71		
3 Cancri	6.0	4.92	14.3	17 34.9	14 11.7	-1 39.1	+0.0089	0.5340	0.1457	+39	-29		
5 Cancri	6.3	4.89	14.1	16 43.8	14 33.7	-1 17.8	+0.8867	0.5337	0.1462	+90	+20		
$\zeta^1$ Cancri	4.8	+4.87	-15.7	+17 56.8	19 48.1	+3 46.9	-1.2310	0.5305	-0.1532	-42	-72		
29 Cancri	6.0	4.67	16.2	14 32.4	22 4 3.6	+11 47.2	+1.1978	0.5257	0.1634	+90	+42		
$\alpha_2$ Cancri	4.0	4.43	18.1	12 14.6	19 21.9	+2 38.0	+1.1003	0.5176	0.1796	+90	+32		
$\omega$ Leonis	5.9	4.20	19.4	9 29.5	28 11 9.8	-6 1.6	+1.1939	0.5109	0.1930	+90	+36		
$\lambda$ Leonis	5.7	4.20	19.9	10 9.3	13 1.5	-4 13.1	+0.0992	0.5102	0.1943	+45	-31		
$\sigma$ Leonis	3.8	+4.13	-20.5	+10 20.8	17 57.1	+0 34.0	-1.0775	0.5085	-0.1977	-23	-80		
11 Sextantis	6.0	4.01	21.0	8 47.4	24 3 7.6	+9 29.0	-1.1962	0.5059	0.2031	-33	-81		
$\pi$ Leonis	5.0	3.99	21.0	8 31.4	4 15.9	+10 35.4	-1.1325	0.5057	0.2037	-28	-81		
14 Sextantis	6.6	3.92	20.5	6 5.9	7 52.0	-9 54.5	+0.8134	0.5049	0.2056	+90	+7		
16 Sextantis	6.9	3.92	20.8	6 39.6	9 12.0	-8 36.8	-0.0827	0.5046	0.2062	+34	-42		
19 Sextantis	6.2	+3.87	-20.5	+5 6.5	11 9.5	-6 42.5	+1.2303	0.5043	-0.2071	+90	+38		
34 Sextantis	6.7	3.69	21.2	4 6.3	25 3 30.6	+9 11.5	-1.0956	0.5026	0.2126	-24	-85		
36 Sextantis	6.6	3.67	21.0	3 0.8	4 54.4	+10 32.9	-0.1866	0.5025	0.2130	+29	-49		
55 Leonis	6.2	3.60	20.7	1 16.2	10 42.2	-7 48.8	+0.4994	0.5027	0.2141	+70	-12		
57 Leonis	6.9	3.59	20.6	0 57.9	10 58.2	-7 33.3	+0.7808	0.5027	0.2141	+90	+3		
$\rho^1$ Leonis	5.4	+3.56	-20.7	+0 32.2	15 3.3	-3 34.9	+0.3779	0.5029	-0.2147	+61	-19		

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z	y	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\beta^1$ Leonis	6.9	+3.52	-20.3	- 0 47.5	25 18 8.7	- 0 34.7	+1.1798	0.5032	-0.2149	+89	+31
$\beta^2$ Leonis	5.7	3.50	20.9	+ 0 28.4	20 37.1	+ 1 49.6	-0.7479	0.5035	0.2151	+ 1	-83
$\epsilon$ Leonis	5.3	3.41	20.2	- 2 27.1	26 5 39.8	+10 37.1	+0.5300	0.5052	0.2149	+72	-11
B. A. C. 4006	6.1	3.31	19.5	4 46.6	16 53.2	- 2 28.3	+0.6791	0.5079	0.2132	+84	- 2
$\eta$ Virginis	5.7	3.14	18.2	8 54.0	27 15 30.4	- 4 30.1	+0.4398	0.5172	0.2047	+63	-15
$\iota$ Virginis	5.7	+3.00	-16.3	-12 11.2	28 18 13.3	- 2 35.6	-1.2221	0.5332	-0.1844	-42	-90
75 Virginis	6.0	3.01	15.4	14 50.9	21 11.7	+ 0 17.2	+1.0938	0.5353	0.1814	+75	+26
83 Virginis	6.0	3.00	14.8	15 40.5	29 2 47.7	+ 5 42.7	+0.9798	0.5392	0.1752	+74	+18
85 Virginis	6.5	2.99	14.8	15 15.9	3 19.3	+ 6 13.2	+0.4470	0.5397	0.1746	+58	-14
B. A. C. 4700	5.6	2.95	13.8	15 49.7	15 12.4	- 6 16.9	-0.9371	0.5484	0.1595	-22	-90
B. A. C. 4722	5.8	+2.96	-13.2	-17 44.0	17 17.8	- 4 15.7	+0.7585	0.5501	-0.1566	+72	+ 4
$\iota^1$ Libræ	5.0	2.93	10.2	19 24.7	18 35.4	- 3 50.6	-0.9150	0.5691	0.1141	-22	-90
$\iota^2$ Libræ	6.5	+2.92	-10.1	-19 16.2	19 4.0	- 3 23.1	-1.1184	0.5694	-0.1131	-42	-90
NEW MOON.											

## DECEMBER.

14 Sagittarii	6.0	+3.11	+ 2.8	-21 44.4	8 20 19.7	- 4 56.0	-0.6437	0.5986	+0.0629	-14	-88
B. A. C. 6336	6.2	3.15	4.6	21 28.8	4 5 42.2	+ 4 4.4	-0.2067	0.5936	0.0857	+11	-51
B. A. C. 6347	6.0	+3.14	+ 4.7	-21 8.0	6 6.2	+ 4 27.5	-0.5236	0.5935	+0.0867	- 6	-75
28 Sagittarii	5.6	3.20	5.0	22 29.8	9 2.5	+ 7 16.9	+1.1238	0.5926	0.0937	+68	+33
B. A. C. 6386	7.3	3.15	5.6	20 23.0	9 41.5	+ 7 54.4	-0.9588	0.5924	0.0949	-31	-90
29 Sagittarii	5.5	3.15	5.7	20 26.3	10 24.4	+ 8 35.6	-0.8338	0.5923	0.0969	-23	-90
30 Sagittarii	6.6	3.20	5.5	22 16.6	10 50.6	+ 9 0.8	+1.0726	0.5922	0.0980	+68	+28
31 Sagittarii	7.0	+3.20	+ 5.6	-22 2.3	11 21.8	+ 9 30.8	+0.8825	0.5920	+0.0992	+68	+13
33 Sagittarii	6.0	3.19	5.9	21 28.9	12 7.2	+10 14.4	+0.3937	0.5918	0.1010	+46	-17
$\epsilon^1$ Sagittarii	5.7	3.18	6.2	20 47.2	13 28.0	+11 32.1	-0.1722	0.5913	0.1041	+15	-49
$\epsilon^2$ Sagittarii	3.5	3.20	6.2	21 14.3	13 36.8	+11 40.5	+0.2998	0.5912	0.1045	+41	-22
$\theta$ Sagittarii	3.8	3.23	6.6	21 53.3	16 23.4	- 9 39.3	+1.2568	0.5903	0.1108	+68	+50
$\pi$ Sagittarii	3.1	+3.22	+ 7.1	-21 10.9	18 27.0	- 7 40.6	+0.7754	0.5896	+0.1155	+69	+ 5
$\delta$ Sagittarii	5.0	3.19	8.1	19 7.8	21 39.7	- 4 35.2	-0.9186	0.5883	0.1227	-26	-90
B. A. C. 6658	7.3	3.20	9.1	18 33.6	5 1 54.5	- 0 30.3	-0.9540	0.5866	0.1318	-27	-90
B. A. C. 6707	6.4	3.24	9.6	19 4.4	5 18.2	+ 2 45.7	+0.0235	0.5851	0.1388	+29	-38
B. A. C. 6710	5.8	3.23	9.7	18 27.2	5 34.1	+ 3 0.9	-0.5658	0.5849	0.1394	- 3	-78
57 Sagittarii	6.1	+3.28	+10.7	-19 17.9	11 46.7	+ 8 59.4	+1.1921	0.5820	+0.1517	+71	+38
B. A. C. 6992	6.7	3.30	13.8	15 6.0	23 45.3	- 3 28.8	-1.0976	0.5760	0.1732	-33	-90
$\beta$ Capricorni	3.2	3.30	13.6	15 5.8	23 51.2	- 3 23.1	-1.0835	0.5759	0.1733	-32	-90
B. A. C. 7087	6.3	3.32	15.0	14 3.8	6 5 26.8	+ 2 0.2	-1.1302	0.5731	0.1823	-35	-90
$\gamma_1$ Capricorni	7.0	3.36	14.8	15 29.6	6 46.5	+ 3 17.0	+0.5547	0.5723	0.1843	+66	- 9
$\gamma_2$ Capricorni	5.6	+3.36	+15.0	-15 18.3	7 36.0	+ 4 4.7	+0.5176	0.5719	+0.1855	+63	-11
8 Aquarii	6.8	3.40	16.9	13 26.4	16 30.3	-11 20.3	+0.3451	0.5674	0.1979	+54	-20
9 Aquarii	6.8	3.41	16.8	13 55.2	17 1.8	-10 49.9	+0.9335	0.5671	0.1985	+76	+14
$\nu$ Aquarii	4.7	3.41	18.0	11 46.5	20 44.0	- 7 15.6	-0.4861	0.5653	0.2030	+ 9	-70
19 Aquarii	5.8	3.44	19.2	10 10.4	7 3 36.7	- 0 37.5	-0.6799	0.5621	0.2106	- 1	-88
B. A. C. 7562	5.5	+3.52	+20.7	- 9 29.7	12 22.5	+ 7 50.0	+0.5187	0.5583	+0.2187	+69	-11
$\epsilon^1$ Capricorni	5.5	3.51	20.7	9 32.5	12 24.7	+ 7 52.1	+0.5726	0.5583	0.2187	+72	- 8
$\epsilon^2$ Capricorni	6.4	3.52	20.7	9 44.2	12 58.6	+ 8 24.8	+0.8941	0.5581	0.2192	+80	+11
30 Aquarii	5.8	3.56	22.3	7 0.3	20 39.0	- 8 10.6	-0.1610	0.5551	0.2247	+29	-48
B. A. C. 7704	7.3	3.58	22.8	6 19.0	22 39.3	- 6 14.4	-0.4048	0.5544	0.2260	+16	-63
B. A. C. 7744	6.7	+3.58	+23.1	- 5 12.7	8 0 57.2	- 4 1.2	-0.9995	0.5537	+0.2273	-18	-90
B. A. C. 7752	6.7	3.59	23.5	4 56.7	1 28.0	- 3 31.5	-1.1525	0.5535	0.2276	-30	-90
44 Aquarii	6.4	3.62	23.5	5 53.1	2 56.1	- 2 6.3	+0.1318	0.5531	0.2283	+45	-32
51 Aquarii	5.8	3.65	23.8	5 20.5	6 7.9	+ 0 58.9	+0.3149	0.5521	0.2298	+57	-22
$\kappa$ Aquarii	5.2	3.70	24.4	- 4 44.5	12 23.3	+ 7 1.7	+1.1541	0.5506	0.2320	+85	+29
Lalande 44337	6.3	+3.71	+24.9	4 4.3	13 47.0	+ 8 22.6	+0.7992	0.5502	+0.2324	+86	+ 4

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.		
		Δα	Δδ										
		s	"	°	d h m	h m				°	°		
3 Piscium	6.4	+3.79	+26.7	- 0 20.9	8 22 56.5	- 6 46.2	-0.8356	0.5486	+0.2339	- 7	-90		
κ Piscium	4.7	3.95	27.3	+ 0 42.6	9 11 7.4	+ 5 0.3	+0.9381	0.5478	0.2332	+90	+13		
9 Piscium	6.6	3.95	27.3	0 34.5	11 16.2	+ 5 8.8	+1.1096	0.5478	0.2331	+90	+25		
16 Piscium	5.8	3.99	27.9	1 33.0	15 31.2	+ 9 15.4	+1.1089	0.5475	0.2321	+90	+25		
19 Piscium	4.9	4.05	28.3	2 56.1	20 9.4	-10 15.6	+0.7740	0.5476	0.2306	+90	+ 3		
36 Piscium	6.3	+4.24	+29.6	+ 7 41.3	10 10 6.7	+ 3 13.8	-0.8982	0.5490	+0.2234	-11	-82		
d Piscium	5.3	4.27	29.5	7 38.2	11 58.1	+ 5 1.5	-0.4336	0.5493	0.2222	+16	-63		
45 Piscium	6.9	4.31	29.1	7 8.5	14 18.8	+ 7 17.5	+0.5928	0.5497	0.2205	+78	- 6		
75 Piscium	6.0	4.62	29.6	12 23.4	11 8 57.3	+ 1 18.4	-0.8559	0.5541	0.2033	- 9	-78		
7 Piscium	3.7	4.81	28.9	14 50.0	20 9.4	-11 52.6	-1.1338	0.5576	0.1896	-32	-75		
101 Piscium	6.3	+4.85	+28.4	+14 9.2	22 4.9	-10 1.1	-0.0708	0.5582	+0.1871	+36	-36		
104 Piscium	7.5	4.88	28.1	13 46.8	23 38.0	- 8 31.1	+0.6014	0.5587	0.1849	+80	- 1		
27 Arietis	6.3	5.26	24.9	17 15.8	12 22 19.3	-10 37.6	+0.8072	0.5665	0.1487	+90	+15		
B. A. C. 782	7.0	5.31	25.0	18 26.5	23 28.6	- 9 30.8	-0.2438	0.5669	0.1466	+25	-42		
μ Arietis	6.0	5.42	24.3	19 35.3	18 3 15.4	- 5 52.1	-0.8934	0.5682	0.1396	-13	-70		
47 Arietis	6.0	+5.54	+22.9	+20 16.2	10 0.2	+ 0 38.2	-0.7060	0.5702	+0.1267	- 1	-69		
δ Arietis	4.0	5.57	21.3	19 21.0	15 48.8	+ 6 14.2	+0.9547	0.5718	0.1150	+90	+28		
ζ Arietis	4.8	5.62	21.1	20 40.6	17 12.0	+ 7 34.4	-0.2705	0.5721	0.1122	+24	-40		
71 Arietis	5.0	5.66	20.4	20 47.3	19 53.4	+10 10.0	-0.0939	0.5728	0.1065	+33	-30		
72 Arietis	5.3	5.65	20.2	20 23.2	20 32.9	+10 48.1	+0.3949	0.5730	0.1052	+64	- 4		
65 Arietis	6.0	+5.67	+20.0	+20 27.0	21 15.6	+11 29.2	+0.4033	0.5731	+0.1037	+65	- 3		
B. A. C. 1055	6.8	5.71	20.3	21 41.4	21 18.1	+11 31.6	-0.8876	0.5731	0.1036	-13	-68		
B. A. C. 1143	6.0	5.79	17.6	20 36.9	14 5 45.0	- 4 20.1	+1.0362	0.5748	0.0853	+90	+37		
B. A. C. 1189	6.0	5.86	17.1	21 56.6	8 1.9	- 2 8.2	-0.1668	0.5752	0.0803	+29	-31		
32 Tauri	6.0	5.90	16.3	22 11.5	10 57.7	+ 0 41.2	-0.2024	0.5755	0.0737	+27	-33		
33 Tauri	6.3	+5.93	+16.3	+22 53.2	11 2.2	+ 0 45.5	-0.9268	0.5755	+0.0735	-16	-67		
B. A. C. 1238	6.3	5.94	15.8	22 55.3	12 40.4	+ 2 20.2	-0.8465	0.5757	0.0699	-11	-67		
A <sup>1</sup> Tauri	4.6	5.92	15.0	21 48.6	14 16.1	+ 3 52.3	+0.4301	0.5759	0.0662	+67	+ 2		
A <sup>2</sup> Tauri	6.3	5.92	15.0	21 44.4	14 32.2	+ 4 7.8	+0.5206	0.5759	0.0657	+75	+ 8		
56 Tauri	6.0	5.95	13.2	21 32.0	20 33.8	+ 9 56.2	+1.0951	0.5762	0.0519	+90	+45		
χ <sup>1</sup> Tauri	4.7	+6.00	+12.5	+22 4.0	22 58.7	-11 44.2	+0.6523	0.5762	+0.0463	+89	+16		
χ <sup>2</sup> Tauri	6.3	5.99	12.5	21 58.3	23 0.0	-11 43.0	+0.7523	0.5762	0.0462	+90	+22		
ν <sup>1</sup> Tauri	4.7	6.03	12.4	22 35.3	23 21.9	-11 22.0	+0.1199	0.5762	0.0454	+46	-12		
ν <sup>2</sup> Tauri	6.0	6.03	12.4	22 46.3	23 46.9	-10 57.8	-0.0556	0.5762	0.0444	+36	-22		
τ Tauri	4.5	6.08	10.2	22 46.0	15 6 5.4	- 4 53.3	+0.1847	0.5759	0.0298	+50	- 7		
95 Tauri	6.3	+6.14	+10.0	+23 54.0	6 29.0	- 4 30.5	-1.0028	0.5758	+0.0289	-23	-66		
B. A. C. 1463	6.3	6.12	9.6	23 26.7	7 32.2	- 3 29.7	-0.4928	0.5758	0.0264	+11	-47		
99 Tauri	6.0	6.16	8.0	23 47.6	12 39.0	+ 1 25.9	-0.7571	0.5752	0.0145	- 4	-66		
103 Tauri	6.0	6.20	6.5	24 8.0	17 0.5	+ 5 37.8	-1.0791	0.5746	+0.0045	-30	-66		
108 Tauri	6.3	6.12	5.3	22 10.3	20 10.3	+ 8 40.7	+1.0078	0.5738	-0.0029	+90	+47		
π Tauri	5.7	+6.12	+ 4.7	+21 59.6	21 47.9	+10 14.8	+1.1928	0.5735	-0.0067	+90	+58		
121 Tauri	6.0	6.23	2.5	23 58.4	16 4 40.6	- 7 7.4	-1.0181	0.5716	0.0224	-24	-66		
B. A. C. 1802	6.0	6.20	+ 1.2	23 9.4	8 4.7	- 3 50.7	-0.2379	0.5705	0.0302	+25	-31		
NEPTUNE				22 4.6	9 44.7	- 2 14.4	+0.8632	0.5712	0.0337	+90	+30		
140 Tauri	7.0	6.19	- 1.3	22 53.6	15 30.4	+ 3 19.1	-0.2407	0.5677	-0.0464	+25	-32		
141 Tauri	6.7	+6.17	- 1.5	+22 23.8	16 3.0	+ 3 50.5	+0.2653	0.5675	-0.0476	+55	- 5		
1 Geminorum	5.0	6.20	2.0	23 16.1	17 5.4	+ 4 50.7	-0.7185	0.5671	0.0498	- 3	-66		
2 Geminorum	7.2	6.23	2.1	23 38.8	17 49.2	+ 5 32.9	-1.1618	0.5668	0.0514	-38	-66		
3 Geminorum	6.3	6.19	2.7	23 7.7	19 32.7	+ 7 12.8	-0.6987	0.5661	0.0551	- 1	-65		
4 Geminorum	7.4	6.20	2.8	23 0.8	19 53.0	+ 7 32.4	-0.5935	0.5659	0.0558	+ 5	-57		
6 Geminorum	6.7	+6.19	- 3.0	+22 55.8	20 41.0	+ 8 18.7	-0.5503	0.5655	-0.0575	+ 8	-54		
7 Geminorum	3.5	6.17	3.4	22 32.1	21 49.1	+ 9 24.4	-0.1926	0.5650	0.0599	+28	-31		
μ Geminorum	3.2	6.17	4.7	22 33.8	17 1 22.4	-11 9.9	-0.4498	0.5633	0.0674	+14	-47		
14 Geminorum	7.2	6.13	5.1	21 42.0	2 36.6	- 9 58.2	+0.3944	0.5627	0.0699	+64	0		
d Geminorum	6.0	6.09	8.7	21 52.7	14 10.6	+ 1 11.8	-0.7413	0.5567	0.0928	- 4	-68		
ζ Geminorum	4.0	+6.01	-10.4	+20 42.9	19 55.0	+ 6 44.6	-0.0487	0.5532	-0.1035	+36	-27		

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
56 Geminorum	5.7	+5.95	-12.8	+20 37.8	18 4 9.7	- 9 17.1	-0.8741	0.5485	-0.1180	-12	-69
61 Geminorum	6.0	5.94	13.4	20 27.3	6 29.7	- 7 1.8	-0.9623	0.5472	0.1219	-19	-70
f Geminorum	6.0	5.78	14.7	17 54.0	12 27.3	- 1 15.9	+1.0618	0.5435	0.1315	+90	+34
g Geminorum	5.3	5.79	15.7	18 45.1	15 36.6	+ 1 47.3	-0.2882	0.5416	0.1363	+22	-44
B. A. C. 2658	7.2	5.73	17.5	18 31.1	22 37.5	+ 8 34.7	-1.0266	0.5372	0.1466	-22	-71
3 Cancrī	6.0	+5.70	-17.4	+17 34.8	22 41.5	+ 8 38.6	-0.0124	0.5372	-0.1467	+38	-30
5 Cancrī	6.3	5.67	17.4	16 43.7	23 3.2	+ 8 59.7	+0.8651	0.5370	0.1472	+90	+18
ζ Cancrī	4.8	5.67	18.9	17 56.8	19 4 15.6	- 9 57.8	-1.2519	0.5339	0.1542	-45	-72
29 Cancrī	6.0	5.49	19.9	14 32.4	12 27.6	- 2 1.1	+1.1744	0.5290	0.1644	+90	+39
α Cancrī	4.0	5.28	22.5	12 14.5	20 3 39.7	-11 16.4	+1.0768	0.5206	0.1806	+90	+28
ω Leonis	5.9	+5.07	-24.3	+ 9 29.4	19 22.2	+ 3 58.7	+1.1714	0.5132	-0.1938	+90	+31
h Leonis	5.7	5.06	24.7	10 9.2	21 13.3	+ 5 46.6	+0.0775	0.5124	0.1951	+43	-32
o Leonis	3.8	5.00	25.5	10 20.7	21 2 7.6	+10 32.3	-1.0986	0.5105	0.1984	-25	-80
11 Sextantis	6.0	4.89	26.2	8 47.3	11 16.5	- 4 34.2	-1.2147	0.5073	0.2036	-36	-81
π Leonis	5.0	4.87	26.3	8 31.3	12 24.7	- 3 28.0	-1.1534	0.5070	0.2042	-28	-81
14 Sextantis	6.6	+4.79	-25.9	+ 6 5.8	16 0.4	+ 0 1.7	+0.7945	0.5060	-0.2058	+90	+ 5
16 Sextantis	6.9	4.79	26.2	6 39.5	17 20.3	+ 1 19.3	-0.1020	0.5055	0.2064	+33	-43
19 Sextantis	6.2	4.74	25.9	5 6.4	19 17.6	+ 3 13.4	+1.2127	0.5051	0.2073	+90	+36
34 Sextantis	6.7	4.59	26.7	4 6.2	22 11 39.8	- 4 51.6	-1.1139	0.5022	0.2123	-26	-86
36 Sextantis	6.6	4.57	26.5	3 0.7	13 3.9	- 3 29.9	-0.2025	0.5021	0.2126	-28	-50
55 Leonis	6.2	+4.51	-26.3	+ 1 16.1	18 53.1	+ 2 9.8	+0.4892	0.5017	-0.2135	+69	-13
57 Leonis	6.9	4.50	26.2	0 57.9	19 9.2	+ 2 25.4	+0.7682	0.5017	0.2135	+90	+ 3
ρ <sup>1</sup> Leonis	5.4	4.46	26.4	+ 0 32.1	23 15.5	+ 6 25.0	+0.3655	0.5016	0.2139	+61	-29
ρ <sup>2</sup> Leonis	6.9	4.43	26.2	- 0 47.6	23 2 22.0	+ 9 26.4	+1.1701	0.5016	0.2141	+89	+30
ρ <sup>3</sup> Leonis	5.7	4.41	26.7	+ 0 28.3	4 51.5	+11 51.8	-0.7631	0.5019	0.2141	- 2	-80
ε Leonis	5.3	+4.32	-26.0	- 2 27.2	13 58.5	- 3 16.3	+0.5219	0.5025	-0.2136	+72	-11
B. A. C. 4006	6.1	4.22	25.2	4 46.7	24 1 18.8	+ 7 45.1	+0.6748	0.5046	0.2116	+85	- 2
γ Virginis	5.7	4.03	23.5	8 54.1	25 0 14.5	+ 6 1.9	+0.4394	0.5125	0.2026	+63	-16
δ Virginis	5.7	3.85	20.8	12 11.3	26 3 23.8	+ 8 22.9	-1.2274	0.5275	0.1822	-42	-90
75 Virginis	6.0	3.86	19.6	14 50.9	6 25.3	+11 18.8	+1.1029	0.5295	0.1793	+75	+27
83 Virginis	6.0	+3.85	-18.8	-15 40.6	12 7.0	- 7 10.1	+0.9919	0.5334	-0.1732	+74	+19
85 Virginis	6.5	3.83	18.8	15 15.9	12 39.1	- 6 39.0	+0.4531	0.5338	0.1726	+59	-14
B. A. C. 4700	5.6	3.76	17.4	15 49.8	27 0 44.0	+ 5 2.7	-0.9376	0.5427	0.1577	-22	-90
B. A. C. 4722	5.8	3.78	16.6	17 44.1	2 51.4	+ 7 6.0	+0.7670	0.5444	0.1549	+72	+ 4
ι Libræ	5.0	3.65	12.6	19 24.8	28 4 29.0	+ 7 51.0	-0.9122	0.5648	0.1132	-25	-90
ρ Libræ	6.5	+3.64	-12.5	-19 16.2	4 57.9	+ 8 18.9	-1.1164	0.5651	-0.1123	-41	-90
ρ Ophiuchi (S. star)	5.0	3.59	6.1	23 13.0	29 11 10.7	-10 35.3	+0.5537	0.5867	0.0472	+53	- 7
URANUS				21 54.3	16 52.4	- 5 6.8	-1.0258	0.5875	0.0321	-42	-90
15 Ophiuchi	7.3	+3.55	- 4.5	-22 59.8	19 2.9	- 3 1.4	+0.0303	0.5910	-0.0280	+19	-37

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1899.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
3 Piscium	6.4	+3.79	+26.7	- 0 20.9	8 22 56.5	- 6 46.2	-0.8356	0.5486	+0.2339	- 7	-90
$\kappa$ Piscium	4.7	3.95	27.3	+ 0 42.6	9 11 7.4	+ 5 0.3	+0.9381	0.5478	0.2332	+90	+13
9 Piscium	6.6	3.95	27.3	0 34.5	11 16.2	+ 5 8.8	+1.1096	0.5478	0.2331	+90	+25
16 Piscium	5.8	3.99	27.9	1 33.0	15 31.2	+ 9 15.4	+1.1089	0.5475	0.2321	+90	+25
19 Piscium	4.9	4.05	28.3	2 56.1	20 9.4	-10 15.6	+0.7740	0.5476	0.2306	+90	+ 3
36 Piscium	6.3	+4.24	+29.6	+ 7 41.3	10 10 6.7	+ 3 13.8	-0.8982	0.5490	+0.2234	-11	-82
$\delta$ Piscium	5.3	4.27	29.5	7 38.2	11 58.1	+ 5 1.5	-0.4336	0.5493	0.2222	+16	-63
45 Piscium	6.9	4.31	29.1	7 8.5	14 18.8	+ 7 17.5	+0.5928	0.5497	0.2205	+78	- 6
75 Piscium	6.0	4.62	29.6	12 25.4	11 8 57.3	+ 1 18.4	-0.8559	0.5541	0.2033	- 9	-78
$\eta$ Piscium	3.7	4.81	28.9	14 50.0	20 9.4	-11 52.6	-1.1338	0.5576	0.1896	-32	-75
101 Piscium	6.3	+4.85	+28.4	+14 9.2	22 4.9	-10 1.1	-0.0708	0.5582	+0.1871	+36	-36
104 Piscium	7.5	4.88	28.1	13 46.8	23 38.0	- 8 31.1	+0.6014	0.5587	0.1849	+80	- 1
27 Arietis	6.3	5.26	24.9	17 15.8	12 22 19.3	-10 37.6	+0.8072	0.5665	0.1487	+90	+15
B. A. C. 782	7.0	5.31	25.0	18 26.5	23 28.6	- 9 30.8	-0.2438	0.5669	0.1466	+25	-42
$\mu$ Arietis	6.0	5.42	24.3	19 35.3	18 3 15.4	- 5 52.1	-0.8934	0.5682	0.1396	-13	-70
47 Arietis	6.0	+5.54	+22.9	+20 16.2	10 0.2	+ 0 38.2	-0.7060	0.5702	+0.1267	- 1	-69
$\delta$ Arietis	4.0	5.57	21.3	19 21.0	15 48.8	+ 6 14.2	+0.9547	0.5718	0.1150	+90	+28
$\zeta$ Arietis	4.8	5.62	21.1	20 40.6	17 12.0	+ 7 34.4	-0.2705	0.5721	0.1122	+24	-40
$\gamma_1$ Arietis	5.0	5.66	20.4	20 47.3	19 53.4	+10 10.0	-0.0939	0.5728	0.1065	+33	-30
$\gamma_2$ Arietis	5.3	5.65	20.2	20 23.2	20 32.9	+10 48.1	+0.3949	0.5730	0.1052	+64	- 4
65 Arietis	6.0	+5.67	+20.0	+20 27.0	21 15.6	+11 29.2	+0.4033	0.5731	+0.1037	+65	- 3
B. A. C. 1055	6.8	5.71	20.3	21 41.4	21 18.1	+11 31.6	-0.8876	0.5731	0.1036	-13	-68
B. A. C. 1143	6.0	5.79	17.6	20 36.9	14 5 45.0	- 4 20.1	+1.0362	0.5748	0.0853	+90	+37
B. A. C. 1189	6.0	5.86	17.1	21 56.6	8 1.9	- 2 8.2	-0.1668	0.5752	0.0803	+29	-31
32 Tauri	6.0	5.90	16.3	22 11.5	10 57.7	+ 0 41.2	-0.2024	0.5755	0.0737	+27	-33
33 Tauri	6.3	+5.93	+16.3	+22 53.2	11 2.2	+ 0 45.5	-0.9268	0.5755	+0.0735	-16	-67
B. A. C. 1238	6.3	5.94	15.8	22 55.3	12 40.4	+ 2 20.2	-0.8465	0.5757	0.0699	-11	-67
A <sup>1</sup> Tauri	4.6	5.92	15.0	21 48.6	14 16.1	+ 3 52.3	+0.4301	0.5759	0.0662	+67	+ 2
A <sup>2</sup> Tauri	6.3	5.92	15.0	21 44.4	14 32.2	+ 4 7.8	+0.5206	0.5759	0.0657	+75	+ 8
56 Tauri	6.0	5.95	13.2	21 32.0	20 33.8	+ 9 56.2	+1.0951	0.5762	0.0519	+90	+45
$\chi$ Tauri	4.7	+6.00	+12.5	+22 4.0	22 58.7	-11 44.2	+0.6523	0.5762	+0.0463	+89	+16
$\chi^2$ Tauri	6.3	5.99	12.5	21 58.3	23 0.0	-11 43.0	+0.7523	0.5762	0.0462	+90	+22
$\nu$ Tauri	4.7	6.03	12.4	22 35.3	23 21.9	-11 22.0	+0.1199	0.5762	0.0454	+46	-12
$\nu^2$ Tauri	6.0	6.03	12.4	22 46.3	23 46.9	-10 57.8	-0.0556	0.5762	0.0444	+36	-22
$\tau$ Tauri	4.5	6.08	10.2	22 46.0	15 6 5.4	- 4 53.3	+0.1847	0.5759	0.0298	+50	- 7
95 Tauri	6.3	+6.14	+10.0	+23 54.0	6 29.0	- 4 30.5	-1.0028	0.5758	+0.0289	-23	-66
B. A. C. 1463	6.3	6.12	9.6	23 26.7	7 32.2	- 3 29.7	-0.4928	0.5758	0.0264	+11	-47
99 Tauri	6.0	6.16	8.0	23 47.6	12 39.0	+ 1 25.9	-0.7571	0.5752	0.0145	- 4	-66
103 Tauri	6.0	6.20	6.5	24 8.0	17 0.5	+ 5 37.8	-1.0791	0.5746	+0.0045	-30	-66
108 Tauri	6.3	6.12	5.3	22 10.3	20 10.3	+ 8 40.7	+1.0078	0.5738	-0.0029	+90	+47
$\pi$ Tauri	5.7	+6.12	+ 4.7	+21 59.6	21 47.9	+10 14.8	+1.1928	0.5735	-0.0067	+90	+58
121 Tauri	6.0	6.23	2.5	23 58.4	4 40.6	- 7 7.4	-1.0181	0.5716	0.0224	-24	-66
B. A. C. 1802	6.0	6.20	+ 1.2	23 9.4	8 4.7	- 3 50.7	-0.2379	0.5705	0.0302	+25	-31
NEPTUNE				22 4.6	9 44.7	- 2 14.4	+0.8632	0.5712	0.0337	+90	+30
140 Tauri	7.0	6.19	- 1.3	22 53.6	15 30.4	+ 3 19.1	-0.2407	0.5677	0.0464	+25	-32
141 Tauri	6.7	+6.17	- 1.5	+22 23.8	16 3.0	+ 3 50.5	+0.2653	0.5675	-0.0476	+55	- 5
1 Geminorum	5.0	6.20	2.0	23 16.1	17 5.4	+ 4 50.7	-0.7185	0.5671	0.0498	- 3	-66
2 Geminorum	7.2	6.23	2.1	23 38.8	17 49.2	+ 5 32.9	-1.1618	0.5668	0.0514	-38	-66
3 Geminorum	6.3	6.19	2.7	23 7.7	19 32.7	+ 7 12.8	-0.6987	0.5661	0.0551	- 1	-65
4 Geminorum	7.4	6.20	2.8	23 0.8	19 53.0	+ 7 32.4	-0.5935	0.5659	0.0558	+ 5	-57
6 Geminorum	6.7	+6.19	- 3.0	+22 55.8	20 41.0	+ 8 18.7	-0.5503	0.5655	-0.0575	+ 8	-54
$\eta$ Geminorum	3.5	6.17	3.4	22 32.1	21 49.1	+ 9 24.4	-0.1926	0.5650	0.0599	+28	-31
$\mu$ Geminorum	3.2	6.17	4.7	22 33.8	17 1 22.4	-11 9.9	-0.4498	0.5633	0.0674	+14	-47
14 Geminorum	7.2	6.13	5.1	21 42.0	2 36.6	- 9 58.2	+0.3944	0.5627	0.0699	+64	0
$\delta$ Geminorum	6.0	6.09	8.7	21 52.7	14 10.6	+ 1 11.8	-0.7413	0.5567	0.0928	- 4	-68
$\zeta$ Geminorum	4.0	+6.01	-10.4	+20 42.9	19 55.0	+ 6 44.6	-0.0487	0.5532	-0.1035	+36	-27

## OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1899.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Oc- cultation.		
			Washington.		Angle from		Washington.		Angle from				
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.			
July	19	B. A. C. 5846	6.8	h m	h m	°	°	h m	h m	°	°	h m	
	19	θ Ophiuchi	3.3	20 19	12 28	111	76	21 18	13 26	231	188	0 58	
	25	κ Piscium	4.7	23 6	14 51	96	100	0 4	15 49	195	157	0 31	
	30	B. A. C. 1189	6.0	20 41	12 7	32	88	21 19	12 44	300	182	0 58	
	30	32 Tauri	6.0	23 37	15 2	80	137	0 47	16 12	245	355	0 37	
Aug.	1	B. A. C. 1801	6.0	22 54	14 12	99	155	23 50	15 8	250	301	1 10	
	8	55 Leonis †	6.2	16 27	7 17	90	39	17 20	8 11	318	245	0 56	
	15	18 Ophiuchi	6.7	18 18	8 41	81	61	19 36	9 59	274	267	0 54	
	16	B. A. C. 6066	7.3	21 39	11 57	38	357	22 28	12 47	296	241	1 18	
	17	ν <sup>1</sup> Sagittarii	5.0	18 22	8 37	114	120	19 24	9 39	216	249	0 50	
	17	ν <sup>2</sup> Sagittarii	5.1	18 54	9 9	109	108	19 58	10 12	217	208	1 2	
	17	ο Sagittarii *	3.8	23 50	14 4	76	28	0 45	14 59	247	203	1 3	
	24	104 Piscium	7.5	19 54	9 42	52	105	20 50	10 37	258	194	0 55	
	27	ν <sup>1</sup> Tauri †	4.7	20 44	10 19	69	126	21 35	11 10	269	311	0 55	
	27	ν <sup>2</sup> Tauri	6.0	21 17	10 52	35	92	21 55	11 30	303	325	0 51	
Sept.	29	μ Geminorum	3.2	0 51	14 18	51	106	1 44	15 11	307	358	0 38	
	8	83 Virginis	6.0	16 46	5 35	104	67	18 1	6 49	291	4	0 53	
	12	B. A. C. 5868	7.0	17 12	5 45	22	24	17 48	6 21	333	245	1 14	
	18	κ Piscium	4.7	23 35	11 43	70	66	0 47	12 55	223	327	0 36	
	18	9 Piscium	6.6	23 47	11 55	106	99	0 34	12 43	187	203	1 12	
	19	45 Piscium	6.9	1 36	13 41	62	37	2 50	14 54	238	165	0 48	
	22	τ <sub>1</sub> Arietis	5.0	4 53	16 44	39	355	5 54	17 46	300	197	1 13	
	22	65 Arietis	6.0	6 59	18 52	169	114	7 6	18 58	179	246	1 2	
	23	A <sup>1</sup> Tauri	4.6	21 12	9 1	73	128	22 5	9 54	260	123	0 6	
	25	141 Tauri	6.7	0 3	11 44	131	187	0 47	12 28	222	314	0 53	
	26	ζ Geminorum	4.0	5 48	17 24	128	163	7 15	18 51	262	278	0 44	
	27	g Geminorum	5.3	1 11	12 43	63	117	1 45	13 17	311	252	1 27	
	30	16 Sextantis	6.9	3 56	15 17	116	168	4 59	16 19	285	4	0 34	
	Oct.	21	τ Tauri	4.5	0 36	10 35	41	99	1 32	11 31	295	337	1 2
	23	14 Geminorum †	7.2	21 28	7 19	62	118	22 9	8 1	300	351	0 56	
Nov.	7	30 Sagittarii	6.0	18 43	3 36	112	112	19 49	4 41	217	356	0 42	
	7	31 Sagittarii	7.0	19 30	4 22	76	66	20 49	5 42	248	214	1 5	
	10	B. A. C. 7562	5.5	22 28	7 8	9	357	23 20	8 0	286	222	1 20	
	10	c <sup>1</sup> Capricorni	5.5	22 21	7 1	23	13	23 25	8 5	272	262	0 52	
	10	c <sup>2</sup> Capricorni	6.4	22 47	7 27	99	83	23 43	8 23	197	247	1 4	
	11	Lalande 44337	6.3	23 41	8 16	92	74	0 41	9 17	202	168	0 56	
	12	κ Piscium	4.7	19 20	3 53	54	102	20 26	4 59	247	170	1 1	
	12	9 Piscium	6.6	19 23	3 56	88	135	20 24	4 57	213	288	1 6	
	16	δ Arietis	4.0	22 12	6 29	144	199	22 30	6 46	177	254	1 1	
	16	τ <sub>2</sub> Arietis	5.3	4 21	12 37	98	65	5 38	13 54	240	233	0 17	
	16	65 Arietis	6.0	5 23	13 38	101	53	6 35	14 51	243	190	1 17	
	17	A <sup>2</sup> Tauri	6.3	20 44	4 58	15	72	21 8	5 21	320	243	1 88	
	17	ν <sup>1</sup> Tauri	4.7	7 40	15 51	30	333	8 13	16 24	334	16	0 23	
	23	h Leonis	5.7	3 13	11 1	61	113	3 55	11 44	335	277	0 33	
	25	g <sup>2</sup> Leonis	5.4	5 25	13 6	131	182	6 28	14 8	279	27	0 43	
Dec.	26	B. A. C. 4006	6.1	8 7	15 43	189	233	8 33	16 9	231	328	1 2	
	27	g Virginis †	5.7	6 8	13 40	141	191	6 59	14 31	268	272	0 26	
	6	τ <sub>1</sub> Capricorni	7.0	0 32	7 30	86	43	1 28	8 25	223	319	0 51	
	6	τ <sub>2</sub> Capricorni †	5.6	1 29	8 27	93	45	2 19	9 16	219	175	0 55	
	8	51 Aquarii	5.8	23 45	6 35	8	345	0 34	7 24	286	168	0 49	
	14	A <sup>1</sup> Tauri	4.6	8 40	15 5	91	35	9 41	16 6	272	254	0 49	
	14	A <sup>2</sup> Tauri	6.3	8 59	15 24	106	50	9 57	16 22	256	218	1 1	
	21	14 Sextantis	6.6	9 59	15 56	174	175	10 57	16 54	255	203	0 58	
	23	e Leonis	5.3	6 26	12 16	158	208	7 17	13 7	236	283	0 51	

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.



## PREDICTION OF OCCULTATIONS.

DOWNES'S TABLE GIVING VALUES OF $\tau$ .																													
FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.																													
$\lambda$		Lat. 72°			Lat. 66°			Lat. 60°			Lat. 54°			Lat. 48°			Lat. 42°			Lat. 36°									
		$\tau'$			$\tau'$			$\tau'$			$\tau'$			$\tau'$			$\tau'$			$\tau'$									
		.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50							
h	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	2	2	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	7	7	7	7	7	7	7
20	3	3	4	4	4	5	5	5	6	6	6	7	7	8	8	9	9	10	10	11	11	12	12	12	12	12	12	12	12
30	5	5	6	6	6	7	8	8	9	11	10	11	13	12	13	16	14	16	18	16	18	16	18	16	18	16	18	16	18
40	6	7	8	8	8	9	11	11	12	14	13	15	17	16	18	21	18	21	24	21	24	21	24	21	24	21	24	21	24
50	7	8	10	10	11	13	13	15	17	16	19	21	19	21	23	26	26	28	26	28	26	28	26	28	26	28	26	28	26
1	0	9	10	11	12	14	16	18	21	24	22	26	23	26	31	26	31	36	31	36	31	36	31	36	31	36	31	36	31
10	10	12	13	14	16	18	21	24	27	25	29	34	30	34	40	35	40	47	39	45	40	47	39	45	40	47	39	45	40
20	12	13	15	16	18	21	24	27	30	28	32	37	33	38	45	39	44	52	43	50	43	50	43	50	43	50	43	50	43
30	13	15	17	18	20	23	26	30	33	32	36	41	37	42	49	41	48	56	47	54	47	54	47	54	47	54	47	54	47
40	14	16	18	20	22	25	29	33	36	35	39	44	40	45	52	44	51	59	50	57	50	57	50	57	50	57	50	57	50
50	16	18	20	21	24	28	31	36	39	38	42	47	43	48	55	47	54	62	53	60	53	60	53	60	53	60	53	60	53
2	0	17	19	22	25	30	33	39	43	41	47	52	48	54	61	54	61	69	60	67	60	67	60	67	60	67	60	67	60
10	18	20	23	25	28	32	36	41	45	43	49	54	50	56	63	56	63	71	62	69	62	69	62	69	62	69	62	69	62
20	19	22	24	26	30	34	38	43	47	45	51	56	52	58	65	58	65	73	64	71	64	71	64	71	64	71	64	71	64
30	20	23	26	28	31	36	40	45	49	47	53	58	54	60	67	60	67	75	68	75	68	75	68	75	68	75	68	75	68
40	21	24	27	29	33	37	42	47	51	49	55	60	56	62	69	62	69	77	70	77	70	77	70	77	70	77	70	77	70
50	22	25	28	30	34	39	43	49	53	51	57	62	58	64	71	64	71	79	72	79	72	79	72	79	72	79	72	79	72
3	0	23	26	30	33	38	42	47	51	49	55	60	56	62	69	62	69	77	70	77	70	77	70	77	70	77	70	77	70
10	24	27	31	33	36	42	47	51	56	54	60	65	61	67	74	67	74	81	74	81	74	81	74	81	74	81	74	81	74
20	25	28	32	34	38	43	48	53	57	55	61	66	62	68	75	68	75	83	76	83	76	83	76	83	76	83	76	83	76
30	26	29	33	35	39	44	49	54	58	56	62	67	63	69	76	69	76	84	77	84	77	84	77	84	77	84	77	84	77
40	26	29	33	35	40	45	50	55	59	57	63	68	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
50	27	30	34	36	41	46	51	56	60	58	64	69	65	71	78	71	78	86	79	86	79	86	79	86	79	86	79	86	79
4	0	28	31	35	37	41	47	52	56	54	60	65	61	67	74	67	74	81	74	81	74	81	74	81	74	81	74	81	74
10	28	31	35	38	42	47	52	57	61	59	65	70	62	68	75	68	75	83	76	83	76	83	76	83	76	83	76	83	76
20	29	32	36	38	42	48	53	58	62	60	66	71	63	69	76	69	76	84	77	84	77	84	77	84	77	84	77	84	77
30	29	32	36	39	43	48	53	58	62	60	66	71	63	69	76	69	76	84	77	84	77	84	77	84	77	84	77	84	77
40	29	33	37	39	43	49	54	59	63	61	67	72	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
50	30	33	37	39	44	49	54	59	63	61	67	72	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
5	0	30	33	37	39	44	49	54	59	57	63	68	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
10	30	33	37	40	44	49	54	59	63	61	67	72	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
20	30	33	37	40	44	49	54	59	63	61	67	72	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
30	30	33	37	40	44	49	54	59	63	61	67	72	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
40	30	33	37	39	44	49	54	59	63	61	67	72	64	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
50	30	33	37	39	43	48	53	58	62	60	66	71	63	69	76	69	76	84	77	84	77	84	77	84	77	84	77	84	77
6	0	30	33	37	39	43	48	53	58	56	62	67	63	69	76	69	76	84	77	84	77	84	77	84	77	84	77	84	77
10	30	33	37	39	43	47	52	57	61	59	65	70	65	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
20	29	32	36	38	42	47	52	57	61	59	65	70	65	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
30	29	32	36	38	42	46	51	56	60	58	64	69	65	70	77	70	77	85	78	85	78	85	78	85	78	85	78	85	78
40	29	32	35	37	41	46	51	56	60	58	64	69	65	71	78	71	78	86	79	86	79	86	79	86	79	86	79	86	79
50	28	31	35	37	40	45	50	55	59	57	63	68	64	69	76	69	76	84	77	84	77	84	77	84	77	84	77	84	77
7	0	28	31	34	36	40	44	48	53	51	57	62	58	63	69	62	68	75	68	75	68	75	68	75	68	75	68	75	68
10	27	30	34	35	39	43	47	52	56	54	60	65	61	66	72	65	71	78	71	78	71	78	71	78	71	78	71	78	71
20	27	30	33	35	38	42	46	51	55	53	59	64	60	65	71	64	70	77	70	77	70	77	70	77	70	77	70	77	70
30	26	29	32	34	37	41	45	49	53	51	57	62	58	63	69	62	68	75	68	75	68	75	68	75	68	75	68	75	68
40	26	28	31	33	36	40	44	48	52	50	56	61	57	62	68	61	67	74	67	74	67	74	67	74	67	74	67	74	67
50	25	27	31	32	35	39	43	47	51	49	55	60	56	61	67	60	66	73	66	73	66	73	66	73	66	73	66	73	66
8	0	24	27	30	31	34	38	41	45	43	47	52	48	52	58	53	58	65	58	65	58	65	58	65	58	65	58	65	58
10	24	26	29	30	33	37	40	44	48	46	50	55	47	51	56	52	57	64	57	64	57	64	57	64	57	64	57	64	57
20	23	25	28	29	32	35	38	42	46	44	48	53	45	49	54	50	55	62	55	62	55	62	55	62					

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**FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.**

h		Lat. 30°			Lat. 24°			Lat. 18°			Lat. 12°			Lat. 6°			Lat. 0°		
		x'			x'			x'			x'			x'			x'		
		.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50
h	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	6	7	8	7	7	9	7	8	9	7	8	10	7	8	10	8	9	11	11
20	12	14	16	13	14	18	14	16	19	14	16	20	14	17	21	15	18	21	21
30	17	20	24	19	22	27	20	24	29	21	25	30	21	25	31	22	26	32	32
40	23	27	32	25	29	36	26	32	39	28	33	40	28	34	41	29	34	42	42
50	28	33	40	31	36	44	32	39	48	35	40	50	35	42	51	35	42	52	52
1	0	33	39	47	36	42	52	38	46	56	40	47	59	41	49	60	41	49	61
10	38	45	54	41	48	59	44	52	63	46	54	67	47	56	68	47	56	69	69
20	43	50	60	46	54	65	49	58	70	52	60	74	53	62	75	53	63	76	76
30	48	55	66	51	60	71	54	64	76	57	66	79	58	68	81	59	69	82	82
40	52	60	71	56	65	77	59	69	82	62	72	84	63	73	87	64	74	88	88
50	56	64	76	60	69	82	64	74	87	66	77	89	68	78	92	68	79	93	93
2	0	59	68	80	64	73	86	68	78	91	70	81	95	72	83	97	72	83	98
10	62	72	84	67	77	90	71	81	95	74	85	99	75	87	101	76	87	102	102
20	65	75	87	70	81	94	74	85	99	77	88	103	78	90	105	79	91	106	106
30	68	78	90	73	84	97	77	88	102	80	91	106	81	93	108	82	94	109	109
40	71	81	93	76	87	100	80	91	105	83	94	109	84	96	111	85	97	112	112
50	74	83	96	78	89	102	82	93	107	85	96	111	87	98	113	87	99	114	114
3	0	76	85	98	80	91	104	84	95	109	87	98	113	89	100	115	89	101	116
10	77	87	99	82	92	106	86	97	111	89	100	114	91	102	116	91	103	117	117
20	79	89	101	84	94	107	88	99	112	91	102	115	92	104	118	93	104	118	118
30	80	90	102	85	95	108	89	100	113	92	103	116	94	105	119	94	105	119	119
40	81	91	103	86	96	109	90	101	114	93	104	117	95	106	119	95	106	120	120
50	82	92	104	87	97	110	91	101	114	94	104	118	95	106	120	96	107	120	120
4	0	83	92	104	88	98	110	92	102	114	94	105	118	96	107	120	97	107	120
10	84	93	104	88	98	110	92	102	114	95	105	118	96	107	120	97	107	120	120
20	84	93	104	89	98	110	92	102	114	95	105	117	96	107	119	97	107	120	120
30	84	93	104	89	98	110	92	102	114	95	105	117	96	107	119	97	107	119	119
40	84	93	104	89	98	109	92	102	113	95	104	116	96	106	118	97	107	119	119
50	84	93	103	88	97	108	92	101	113	94	104	115	96	106	117	96	106	118	118
5	0	84	92	102	88	97	108	91	101	112	94	103	114	95	105	116	96	105	117
10	83	92	102	88	96	107	91	100	110	93	102	113	95	104	115	95	104	115	115
20	83	91	101	87	95	106	90	99	109	92	101	112	94	103	114	94	103	114	114
30	82	90	100	86	94	104	88	98	108	92	100	111	93	102	112	93	102	113	113
40	81	89	98	85	93	103	88	97	106	91	99	109	92	100	110				
50	80	88	97	84	92	101	87	95	105	89	97	107							
6	0	79	87	95	83	91	100	86	94	103	88	96	105						
10	78	85	94	82	89	98	84	92	101										
20	77	84	92	80	88	96	82	91	99										
30	75	82	90	79	86	94													
40	74	81	88	77	84	92													
50	72	79	86																
7	0	71	77	84															

(Concluded from preceding page.)

[illegible]

## FOR WASHINGTON MEAN NOON.

Date.	$k$	$i$	$\theta$	$L$	Date.	$k$	$i$	$\theta$	$L$
Jan. 1	0.331	109.8	191.8	46.0	July 1	0.795	53.9	5.1	42.9
6	0.504	89.5	188.4	46.9	5	0.714	64.7	10.0	38.1
11	0.633	75.1	184.7	41.5	10	0.633	74.6	14.2	34.7
16	0.724	63.3	180.5	35.9	15	0.557	83.4	17.7	32.9
21	0.791	54.4	176.2	31.6	20	0.482	92.1	20.7	31.9
26	0.841	47.0	171.5	28.7	25	0.402	101.3	23.6	31.0
31	0.880	40.5	166.6	27.0	30	0.315	111.7	26.6	29.3
Feb. 5	0.912	34.4	161.5	26.6	Aug. 4	0.226	123.2	30.2	26.0
10	0.940	28.3	156.1	27.2	9	0.123	139.0	36.0	17.5
15	0.964	21.6	149.6	29.1	14	0.042	156.3	49.8	7.2
20	0.984	14.4	139.6	32.6	19	0.010	168.6	116.8	1.9
25	0.997	6.4	108.9	38.2	24	0.056	152.5	178.8	10.7
Mar. 2	0.994	8.7	5.7	46.4	29	0.188	128.6	191.8	32.3
7	0.961	22.8	343.4	56.9	Sept. 3	0.386	103.2	198.0	55.3
12	0.875	41.3	336.8	67.4	8	0.605	77.9	203.0	68.0
17	0.724	63.4	333.7	71.4	13	0.793	54.2	207.6	67.7
22	0.525	87.1	331.8	63.6	18	0.914	34.1	212.5	58.3
27	0.324	110.6	329.8	46.5	23	0.975	18.1	221.2	47.4
Apr. 1	0.158	133.9	326.7	26.1	28	0.997	6.4	238.3	38.6
6	0.047	154.8	319.9	8.6	Oct. 3	0.999	4.3	356.8	32.6
11	0.003	173.7	274.4	0.5	8	0.988	12.6	4.7	28.7
16	0.023	162.7	159.2	3.9	13	0.972	19.4	21.0	26.4
21	0.088	145.5	156.1	13.3	18	0.950	25.7	22.2	25.5
26	0.175	130.6	153.2	22.0	23	0.925	31.8	21.9	25.6
May 1	0.266	118.0	152.1	27.7	28	0.892	38.3	20.7	26.9
6	0.353	107.1	151.8	31.0	Nov. 2	0.851	45.4	18.9	29.4
11	0.445	96.3	152.1	33.6	7	0.795	53.8	16.7	33.5
16	0.522	87.4	153.0	36.0	12	0.718	64.2	14.2	39.2
21	0.610	77.2	154.6	39.4	17	0.606	77.8	11.7	46.0
26	0.705	65.8	157.1	44.5	22	0.456	95.1	9.4	51.2
31	0.806	52.2	160.7	51.5	Dec. 27	0.244	120.8	7.6	41.4
June 5	0.906	35.8	166.1	59.9	2	0.052	153.6	2.9	12.3
10	0.979	16.7	166.9	65.3	7	0.004	172.7	215.7	1.0
15	0.998	5.2	315.4	66.6	12	0.159	133.0	200.8	31.1
20	0.958	23.8	350.1	58.8	17	0.387	103.6	197.7	51.8
25	0.882	40.3	358.7	51.7	22	0.562	82.9	194.7	49.9
30	0.795	53.9	5.1	42.9	27	0.691	67.6	191.2	42.9
					32	0.779	56.1	187.1	36.3

## NOTATION.

$k$ , the ratio of the illuminated portion of the apparent disk to the entire apparent disk considered as the superficies of a circle.

$i$ , the angle between the sun and earth, as seen from the planet.

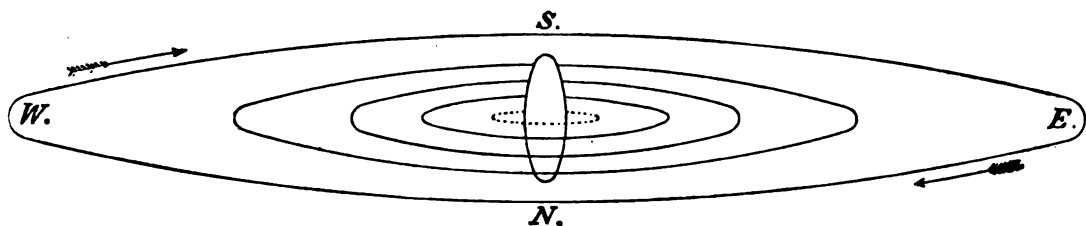
$\theta$ , the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

$L$ , the brilliancy of the disk. The unit of  $L$  is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the sun, and illuminated by the latter as the mean disk of the planet is illuminated.

## FOR WASHINGTON MEAN NOON.

Date.	<i>k</i>	<i>i</i>	$\theta$	<i>L</i>	Date.	<i>k</i>	<i>i</i>	$\theta$	<i>L</i>
Jan. 1	0.221	124.0	196.4	215.3	July 0	0.932	30.2	172.8	52.6
6	0.264	118.1	195.2	218.9	5	0.941	28.2	175.8	51.9
11	0.305	112.9	193.7	215.3	10	0.948	26.3	179.0	51.2
16	0.343	108.3	192.0	207.5	15	0.956	24.3	182.2	50.6
21	0.379	104.0	190.2	197.7	20	0.962	22.4	185.6	50.1
26	0.414	100.1	188.1	186.6	25	0.969	20.4	188.9	49.7
31	0.442	96.6	185.9	175.6	30	0.974	18.5	192.3	49.2
Feb. 5	0.471	93.3	183.5	165.1	Aug. 4	0.979	16.6	195.8	48.9
10	0.498	90.2	181.1	154.9	9	0.984	14.6	199.3	48.6
15	0.524	87.3	178.6	145.5	14	0.988	12.7	202.9	48.3
20	0.548	84.5	176.1	136.8	19	0.991	10.8	206.5	48.0
25	0.571	81.9	173.6	128.9	24	0.994	8.9	211.1	47.9
Mar. 2	0.592	79.3	171.1	121.3	29	0.996	7.0	216.2	47.7
7	0.613	76.9	168.7	114.6	Sept. 3	0.998	5.3	223.8	47.6
12	0.634	74.5	166.4	108.5	8	0.999	3.7	237.6	47.5
17	0.653	72.2	164.3	102.8	13	1.000	2.3	267.3	47.4
22	0.671	70.0	162.3	97.7	18	1.000	2.3	319.0	47.4
27	0.689	67.8	160.5	93.0	23	0.999	3.3	352.4	47.5
Apr. 1	0.706	65.7	158.9	88.7	28	0.998	4.8	2.4	47.5
6	0.722	63.6	157.5	84.8	Oct. 3	0.997	6.5	8.6	47.6
11	0.739	61.5	156.4	81.3	8	0.995	8.3	12.1	47.7
16	0.754	59.5	155.5	78.0	13	0.992	10.0	14.2	47.9
21	0.769	57.5	154.9	75.0	18	0.990	11.7	14.9	48.1
26	0.782	55.5	154.5	72.2	23	0.986	13.5	15.2	48.4
May 1	0.797	53.5	154.4	69.8	28	0.983	15.2	14.8	48.7
6	0.812	51.5	154.5	67.6	Nov. 2	0.978	16.9	14.0	49.0
11	0.824	49.6	154.9	65.5	7	0.974	18.6	12.9	49.4
16	0.837	47.7	155.6	63.6	12	0.969	20.3	11.4	49.9
21	0.849	45.7	156.5	61.8	17	0.964	21.9	9.6	50.4
26	0.861	43.8	157.6	60.3	22	0.958	23.6	7.6	51.0
31	0.872	41.9	159.0	58.8	Dec. 27	0.952	25.2	5.3	51.6
5	0.883	39.9	160.7	57.5	2	0.946	26.9	2.9	52.3
10	0.894	38.0	162.7	56.3	7	0.939	28.6	0.5	53.1
15	0.904	36.0	164.9	55.2	12	0.932	30.2	357.9	53.9
20	0.914	34.1	167.3	54.3	17	0.925	31.9	355.4	54.9
25	0.923	32.1	170.0	53.4	22	0.917	33.6	353.0	55.9
30	0.932	30.2	172.8	52.6	27	0.908	35.3	350.7	56.9
					32	0.899	37.0	348.5	58.1





*APPARENT ORBITS OF THE SATELLITES OF JUPITER IN 1899,  
AS SEEN IN AN INVERTING TELESCOPE.*

*(The vertical scale is three times the horizontal one.)*

The object of this figure is to facilitate the identification of the satellites in cases where the diagrams of configurations do not suffice for that purpose. If two satellites are seen together reference to the above diagram may enable one to identify the inner and outer satellite of the pair. The central, vertical ellipse represents the disk of Jupiter, elongated three times in the vertical direction. The dotted line represents the orbit of Satellite V.

Facing each page of the phenomena of Jupiter's satellites, pages 466—486, is the page of diagrams of configurations for the same month. The light disks ○ in the vertical row in the middle of the page represent the relative position of Jupiter each day. The dots adjacent in the same horizontal space represent the positions of the several satellites on the same day, at the hour and minute of Washington mean time indicated above the diagrams. The latitudes of the satellites are always considered zero in constructing the diagrams, except where two or more satellites chance to be at nearly the same distance from the planet, when they are placed one above the other according to their apparent latitudes. The numerals designating the satellites are placed on the right or left hand side of the dot, according as the motion of the satellite, at the time of the configuration, is toward the east or toward the west—the motion being always toward the numeral. Sometimes, at the epoch of the configuration, one or more satellites will be projected on the disk of the planet: this phenomenon is indicated by a light disk ○ at the left hand side of the page. Frequently, also, one or more satellites will be invisible, being concealed in occultation behind the disk, or eclipsed in the shadow of the planet: this phenomenon is indicated by a dark disk ● at the right hand side of the page. In both cases, the annexed numeral serves to point out which satellite is thus rendered invisible.

When an observation is made at a different hour from that for which the diagram is constructed, the motion of the satellite during the interval may be judged by transferring its given position to the above diagram, and estimating its motion during the elapsed interval by means of the following table of the periods:—

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d h m s		d		d h m s		d
I.	1 18 28 35.945	=	1.76986048		III.	7 3 59 35.854	= 7.16638720
II.	3 13 17 53.735	=	3.55409416		IV.	16 18 5 6.928	= 16.75355241
			d h m s			d	
			0 11 57 27.635	=		0.49823652	

## SATELLITE V.

WASHINGTON MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

Feb.	d	h	E.	May	d	h	E.	Feb.	d	h	W.	May	d	h	W.
	10	8.7	E.		11	12.5	E.		10	14.7	W.		11	18.5	W.
	20	7.8	E.		21	11.6	E.		20	13.8	W.		21	17.6	W.
March	2	7.0	E.		31	10.7	E.	March	2	12.9	W.		31	16.7	W.
	12	18.0	E.	June	10	9.8	E.		12	12.0	W.	June	10	15.8	W.
	22	17.1	E.		20	9.0	E.		22	11.1	W.		20	15.0	W.
April	1	16.2	E.		30	8.1	E.	April	1	10.2	W.		30	14.1	W.
	11	15.3	E.	July	10	7.3	E.		11	9.3	W.	July	10	13.3	W.
	21	14.4	E.		20	6.4	E.		21	8.4	W.		20	12.4	W.
May	1	13.4	E.		29	17.7	E.	May	1	7.4	W.		30	11.6	W.

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

## SATELLITE I.

Jan.	2	h	m	March	23	h	m	June	10	h	m	Aug.	29	h	m
	4	12	14.1		24	3	3.9		16	42.5	31		8	5.5	
	6	6	43.1		26	21	30.1		12	11	9.6		1	2	35.2
	7	1	12.3		28	15	56.3		14	5	36.7		3	21	5.0
	9	19	41.2		30	10	22.6		16	0	4.0		5	15	34.6
	11	14	10.2		31	4	48.7		17	18	31.3		7	10	4.5
	13	8	39.1		2	23	15.0		19	12	58.7		8	4	34.3
	14	3	8.0		4	17	41.0		21	7	26.2		10	23	4.2
	16	21	36.8		6	12	7.1		23	1	53.6		12	17	34.1
	18	16	5.7		8	6	33.0		24	20	21.1		14	12	4.1
Feb.	20	10	34.2	April	9	0	59.1	July	26	14	49.0	Sept.	16	6	34.0
	21	5	2.9		11	19	25.1		28	9	16.6		17	1	4.0
	23	23	31.4		13	13	51.1		30	3	44.4		19	19	34.0
	25	18	0.0		15	8	17.0		1	22	12.2		21	14	4.1
	27	12	28.3		16	2	42.9		3	16	40.2		23	8	34.2
	28	6	56.9		18	21	8.7		5	11	8.2		24	3	4.4
	30	1	25.2		20	15	34.6		7	5	36.4		26	21	34.5
	1	19	53.4		22	10	0.4		9	0	4.5		28	16	4.7
	3	14	21.5		23	4	26.4		10	18	32.6		30	10	34.7
	5	8	49.6		25	22	52.2		12	13	1.0		1	5	5.0
March	6	3	17.7	May	27	17	18.1	Aug.	14	7	29.2	Oct.	3	23	35.1
	8	21	45.8		29	11	43.9		16	1	57.4		5	18	5.5
	10	16	13.6		1	6	9.7		17	20	26.1		7	12	35.7
	12	10	41.6		2	0	35.6		19	14	54.6		9	7	6.0
	13	5	9.3		4	19	1.5		21	9	23.2		10	1	36.2
	15	23	37.0		6	13	27.5		23	3	51.8		12	20	6.5
	17	18	4.6		8	7	53.5		24	22	20.5		14	14	36.8
	19	12	32.4		9	2	19.5		26	16	49.2			9	7.1
	21	6	59.8		11	20	45.5		28	11	18.0				
	22	1	27.4		13	15	11.6		30	5	46.9				
	24	19	54.6	June	15	9	37.6		1	0	15.8	Dec.	11	19	48.3
	26	14	22.0		16	4	4.0		2	18	44.8		13	14	18.6
	28	8	49.2		18	22	30.2		4	13	13.8		15	8	48.8
	1	3	16.5		20	16	56.5		6	7	42.9		17	3	19.0
	3	21	43.5		22	11	22.7		8	2	12.0		18	21	49.0
	5	16	10.6		24	5	48.9		9	20	41.3		20	16	19.2
	7	10	37.4		25	0	15.3		11	15	10.6		22	10	49.2
	9	5	4.3		27	18	41.8		13	9	39.8		24	5	19.4
	11	23	31.2		29	13	8.4		15	4	9.3		25	23	49.4
	12	17	58.1		31	7	35.0		16	22	38.5		27	18	19.5
	14	12	24.8			2	1.6	18	17	8.0					
	16	6	51.4			20	28.3	20	11	37.4					
	17	1	18.0			3	14	55.0	22	6	7.1				
	19	19	44.5			5	9	21.9	24	0	36.5				
	21	14	11.0			7	3	48.8	25	19	6.1				
	22	8	37.6			8	22	15.6	27	13	35.7				

## WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

## SATELLITE II.

Jan.	h	m	March	h	m	June	h	m	Aug.	h	m
3	17	48.1	22	21	19.2	8	22	36.3	26	3	4.4
7	7	7.9	26	10	29.1	12	11	49.2	29	16	27.0
10	20	27.2	29	23	37.9	16	1	1.4	2	5	49.2
14	9	46.3	April 2	12	47.0	19	14	15.4	5	19	12.2
17	23	4.8	6	1	55.0	23	3	28.9	9	8	35.0
21	12	23.1	9	15	3.7	26	16	43.9	12	21	58.4
25	1	40.9	13	4	11.4	30	5	58.5	16	11	21.6
28	14	58.3	16	17	19.7	July 3	19	14.7	20	0	45.1
Feb. 1	4	15.1	20	6	27.0	7	8	30.4	23	14	8.6
4	17	31.8	23	19	35.4	10	21	47.6	27	3	32.6
8	6	47.6	27	8	42.7	14	11	4.3	30	16	56.3
11	20	3.2	30	21	50.8	18	0	22.5	4	6	20.4
15	9	17.9	May 4	10	58.2	21	13	40.1	7	19	44.5
18	22	32.6	8	0	7.0	25	2	59.2	11	9	8.7
22	11	46.3	11	13	15.1	28	16	17.7	14	22	32.9
26	1	0.0	15	2	24.3	Aug. 1	5	37.6	Dec. 14	10	22.0
1	14	12.6	18	15	32.7	4	18	57.2	17	23	45.1
5	3	25.3	22	4	42.8	8	8	17.9	21	13	8.1
8	16	36.9	25	17	52.2	11	21	38.3	25	2	31.1
12	5	48.5	29	7	3.0	15	10	59.7	28	15	54.1
15	18	59.0	June 1	20	13.2	19	0	20.7			
19	8	9.7	5	9	25.1	22	13	42.8			

## SATELLITE III.

Jan.	h	m	March	h	m	June	h	m	Sept	h	m
8	1	39.6	27	19	2.3	14	8	0.4	1	3	37.8
15	5	46.0	April 3	22	23.6	21	11	37.9	8	7	55.5
22	9	48.9	11	1	42.9	28	15	19.5	15	12	15.7
Feb. 29	13	47.4	18	5	0.1	July 5	19	5.8	22	16	37.2
5	17	42.0	25	8	17.0	12	22	57.1	29	21	0.4
12	21	32.6	May 2	11	32.9	20	2	52.1	Oct. 7	1	24.6
20	1	18.8	9	14	50.5	27	6	51.7	14	5	50.5
27	5	0.8	16	18	9.5	Aug. 3	10	54.5	Dec. 17	21	57.2
March 6	8	37.6	23	21	32.1	10	15	0.6	25	2	22.2
13	12	10.1	31	0	57.6	17	19	9.8			
20	15	37.7	June 7	4	27.2	24	23	22.2			

## SATELLITE IV.

Jan.	h	m	April	h	m	June	h	m	Sept.	h	m
13	14	42.0	7	1	0.7	29	3	46.2	21	0	59.5
30	8	57.6	23	15	17.5	July 15	20	55.4	7	21	14.9
Feb. 16	2	20.7	May 10	5	32.7	Aug. 1	14	56.4	Dec. 14	7	33.3
March 4	18	46.3	26	20	10.6	18	9	43.3	31	3	51.5
21	10	16.7	June 12	11	31.1	Sept. 4	5	6.6			



## WASHINGTON MEAN TIME.

## JANUARY.

d	h	m	s				d	h	m	s				d	h	m	s				
1	12	41		I.	Sh.	In.	11	14	40		III.*	Tr.	In.	21	21	14	0.5	I.	Ec.	Dis.	
13	48		I.	Tr.	In.		16	21		III.*	Tr.	Eg.		22	0	37		I.	Oc.	Re.	
14	54		I.*	Sh.	Eg.		12	3	30		I.	Sh.	In.		3	58	36.6	III.	Ec.	Dis.	
16	0		I.*	Tr.	Eg.		4	42		I.	Tr.	In.			5	44	46.0	III.	Ec.	Re.	
20	9		II.	Sh.	In.		5	43		I.	Sh.	Eg.			9	2		III.	Oc.	Dis.	
22	24		II.	Tr.	In.		6	54		I.	Tr.	Eg.			10	36		III.	Oc.	Re.	
22	32		II.	Sh.	Eg.		12	1		II.	Sh.	In.			18	20		I.	Sh.	In.	
2	0	44	29.5	II.	Tr.	Eg.	14	23		II.*	Sh.	Eg.			19	34		I.	Tr.	In.	
10	2		I.	Ec.	Dis.		14	25		II.*	Tr.	In.			20	32		I.	Sh.	Eg.	
13	20		I.	Oc.	Re.		16	43		II.*	Tr.	Eg.			21	45		I.	Tr.	Eg.	
3	7	9		I.	Sh.	In.	13	0	52	30.1	I.	Ec.	Dis.		23	3	53	II.	Sh.	In.	
8	17		I.	Tr.	In.		4	14		I.	Oc.	Re.			6	15		II.	Sh.	Eg.	
9	22		I.	Sh.	Eg.		21	59		I.	Sh.	In.			6	23		II.	Tr.	In.	
10	29		I.	Tr.	Eg.		23	11		I.	Tr.	In.			8	40		II.	Tr.	Eg.	
14	24	25.3	II.	Ec.	Dis.		14	0	12		I.	Sh.	Eg.		15	42	20.3	I.*	Ec.	Dis.	
18	58		II.	Oc.	Re.		1	23		I.	Tr.	Eg.			19	6		I.	Oc.	Re.	
4	4	30	47.8	I.	Ec.	Dis.	6	14	50.5	II.	Ec.	Dis.			24	12	48	I.	Sh.	In.	
5	45		III.	Sh.	In.		8	31	27.5	II.	Ec.	Re.			14	3		I.*	Tr.	In.	
7	48		III.	Sh.	Eg.		8	37		II.	Oc.	Dis.			15	1		I.*	Sh.	Eg.	
7	49		I.	Oc.	Re.		10	55		II.	Oc.	Re.			16	15		I.*	Tr.	Eg.	
10	29		III.	Tr.	In.		19	20	45.8	I.	Ec.	Dis.			22	5	19.7	II.	Ec.	Dis.	
12	15		III.	Tr.	Eg.		22	43		I.	Oc.	Re.			25	0	21	II.	Ec.	Re.	
5	1	37		I.	Sh.	In.	15	0	0	56.3	III.	Ec.	Dis.			0	33	II.	Oc.	Dis.	
2	46		I.	Tr.	In.		1	48	9.1	III.	Ec.	Re.			2	49		I.	Oc.	Re.	
3	50		I.	Sh.	Eg.		4	57		III.	Oc.	Dis.			10	10	36.2	I.	Ec.	Dis.	
4	58		I.	Tr.	Eg.		6	35		III.	Oc.	Re.			13	34		I.*	Oc.	Re.	
9	26		II.	Sh.	In.		16	27		I.*	Sh.	In.			17	38		III.*	Sh.	In.	
11	45		II.	Tr.	In.		17	40		I.*	Tr.	In.			19	38		III.	Sh.	Eg.	
11	49		II.	Sh.	Eg.		18	40		I.*	Sh.	Eg.			22	50		III.	Tr.	In.	
14	4		II.	Tr.	Eg.		19	52		I.	Tr.	Eg.			26	0	22	III.	Tr.	Eg.	
22	59	11.5	I.	Ec.	Dis.		1	18		II.	Sh.	In.			7	17		I.	Sh.	In.	
6	2	18		I.	Oc.	Re.	3	40		II.	Sh.	Eg.			8	32		I.	Tr.	In.	
20	5		I.	Sh.	In.		3	45		II.	Tr.	In.			9	30		I.	Sh.	Eg.	
21	15		I.	Tr.	In.		6	3		II.	Tr.	Eg.			10	44		I.	Tr.	Eg.	
22	18		I.	Sh.	Eg.		13	49	6.6	I.	Ec.	Dis.			17	10		II.*	Sh.	In.	
23	27		I.	Tr.	Eg.		17	12		I.*	Oc.	Re.			19	32		II.	Sh.	Eg.	
7	3	41	14.8	II.	Ec.	Dis.	17	10	55	I.	Sh.	In.			19	41		II.	Tr.	In.	
5	57	59.2	II.	Ec.	Re.		12	9		I.	Tr.	In.			21	57		II.	Tr.	Eg.	
5	59		II.	Oc.	Dis.		13	8		I.	Sh.	Eg.			27	4	38	57.6	I.	Ec.	Dis.
8	17		I.*	Ec.	Dis.		14	21		I.*	Tr.	Eg.			8	3		I.	Oc.	Re.	
20	3	9.2	III.	Ec.	Dis.		19	31	34.4	II.	Ec.	Dis.			28	1	45	I.	Sh.	In.	
20	47		I.	Oc.	Re.		21	56	8.0	II.	Ec.	Re.			3	0		I.	Tr.	In.	
21	51	26.8	III.	Ec.	Re.		21	48		II.	Oc.	Dis.			3	58		I.	Sh.	Eg.	
8	0	48	III.	Oc.	Dis.		18	0	14	II.	Oc.	Re.			5	11		I.	Tr.	Eg.	
2	31		III.	Oc.	Re.		8	17	23.3	I.	Ec.	Dis.			11	22	25.0	II.	Ec.	Dis.	
14	33		I.*	Sh.	In.		11	40		I.	Oc.	Re.			13	38	48.5	II.*	Ec.	Re.	
15	44		I.*	Tr.	In.		13	40		III.	Sh.	In.			13	50		II.*	Oc.	Dis.	
16	46		I.*	Sh.	Eg.		15	41		III.*	Sh.	Eg.			16	6		II.*	Oc.	Re.	
17	56		I.*	Tr.	Eg.		18	47		III.*	Tr.	In.			23	7	12.5	I.	Ec.	Dis.	
22	44		II.	Sh.	In.		20	23		III.	Tr.	Eg.			29	2	31	I.	Oc.	Re.	
9	1	6		II.	Tr.	In.	19	5	23	I.	Sh.	In.			7	56	0.0	III.	Ec.	Dis.	
3	24		II.	Sh.	Eg.		6	38		I.	Tr.	In.			9	41	7.0	III.	Ec.	Re.	
11	55	49.8	II.	Tr.	Eg.		7	36		I.	Sh.	Eg.			13	3		III.*	Oc.	Dis.	
15	17		I.	Ec.	Dis.		8	50		I.	Tr.	Eg.			14	32		III.*	Oc.	Re.	
10	9	2	I.*	Oc.	Re.		14	35		II.*	Sh.	In.			20	13		I.	Sh.	In.	
10	13		I.	Sh.	In.		16	57		II.*	Sh.	Eg.			21	28		I.	Tr.	In.	
11	15		I.	Tr.	In.		17	4		II.*	Tr.	In.			22	26		I.	Sh.	Eg.	
12	25		I.	Sh.	Eg.		19	21		II.	Tr.	Eg.			23	39		I.	Tr.	Eg.	
16	57	56.7	II.*	Ec.	Dis.		20	2	45.2	I.	Ec.	Dis.			30	6	27	II.	Sh.	In.	
19	14	37.3	II.	Ec.	Re.		6	9		I.	Oc.	Re.			8	49		II.	Sh.	Eg.	
19	18		II.	Oc.	Dis.		23	52		I.	Sh.	In.			8	58		II.	Tr.	In.	
21	36		II.	Oc.	Re.		21	1	6	I.	Tr.	In.			11	14		II.	Tr.	Eg.	
11	6	24	7.3	I.	Ec.	Dis.	2	4		I.	Sh.	Eg.			17	35	31.6	I.*	Ec.	Dis.	
9	43		III.	Sh.	In.		3	18		I.	Tr.	Eg.			20	59		I.*	Oc.	Re.	
9	45		I.	Oc.	Re.		8	48	33.5	II.	Ec.	Dis.			31	14	41	I.*	Sh.	In.	
11	45		III.	Sh.	Eg.		11	5	3.5	II.	Ec.	Re.			15	56		I.*	Tr.	In.	
							11	15		II.	Oc.	Dis.			16	54		I.*	Sh.	Eg.	
							13	31		II.*	Oc.	Re.			18	7		I.*	Tr.	Eg.	

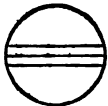
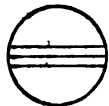

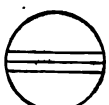
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

JANUARY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I. d * 	III. d r * * 
II. d r * * 	IV. No Eclipse. 

*Configurations at 10<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1				I' O	2'	3'		4'
2			2'	O	I'		3'	4'
3				I' O		3'	4'	2' ●
4				3' O	4' I'	2'		
5			3'	1' 2' O				
6			3' 4'	2' O	I'			
7		4'		3' I' O	2'			
8	O I' 4'			O	2'	3'		
9	4'		2'	O I'		3'		
10	4'			I' 2' O		3'		
11	O 3'	4'		O	I'	2'		
12	O 2'		3' 4' I'	O				
13		3'	2'	O 4'	I'			
14			3' I'	O	2'	4'		
15				O I'	3' 4'			
16			2'	O		3'	4'	I' ●
17			2' I'	O		3'		4'
18				O 3'	I'	2'		4'
19	O 2'		3' I'	O			4'	
20		3'	2'	O	I'	4'		
21			3' I'	O 4'				
22			4'	O 1' 3'	2'			
23		4'	2'	I' O		3'		
24	4'		2' I'	O		3'		
25	4'			O 1' 3'	2'			
26	4'		3' I'	O 2'				
27	4'	3'	2'	O	I'			
28		4'	3' I'	O				2' ●
29			4'	O 3' I'	2'			
30			2' I'	O 4'		3'		
31	O I'		2'	O		4' 3'		

## WASHINGTON MEAN TIME.

## FEBRUARY.

d	h	m	s				d	h	m	s				d	h	m	s			
1	0	39	13.7	II.	Ec.	Dis.	10	0	40		II.	Sh.	Eg.	19	19	49	10.4	III.	Ec.	Dis.
2	55	34.3		II.	Ec.	Re.		0	48		II.	Tr.	In.		21	31	14.4	III.	Ec.	Re.
3	7			II.	Oc.	Dis.		3	2		II.	Tr.	Eg.	20	0	42		III.	Oc.	Dis.
5	23			II.	Oc.	Re.		8	25	17.3	I.	Ec.	Dis.		1	53		I.	Sh.	In.
12	3	47.3		I.	Ec.	Dis.		11	47		I.	Oc.	Re.		1	56		III.	Oc.	Re.
15	27			I.*	Oc.	Re.	11	5	31		I.	Sh.	In.		3	3		I.	Tr.	In.
21	36			III.	Sh.	In.		6	44		I.	Tr.	In.		4	6		I.	Sh.	Eg.
23	35			III.	Sh.	Eg.		7	44		I.	Sh.	Eg.		5	14		I.	Tr.	Eg.
2	2	50		III.	Tr.	In.		8	55		I.	Tr.	Eg.		14	9		II.*	Sh.	In.
4	16			III.	Tr.	Eg.		16	30	36.3	II.*	Ec.	Dis.		16	31		II.*	Sh.	Eg.
9	9			I.	Sh.	In.		18	46	48.0	II.	Ec.	Re.		16	31		II.*	Tr.	In.
10	24			I.	Tr.	In.		18	56		II.	Oc.	Dis.		18	45		II.	Tr.	Eg.
11	22			I.	Sh.	Eg.		21	11		II.	Oc.	Re.		23	14	58.6	I.	Ec.	Dis.
12	35			I.	Tr.	Eg.	12	2	53	31.7	I.	Ec.	Dis.	21	2	33		I.	Oc.	Re.
19	44			II.	Sh.	In.		6	15		I.	Oc.	Re.		20	21		I.	Sh.	In.
22	6			II.	Sh.	Eg.		15	51	24.3	III.*	Ec.	Dis.		21	30		I.	Tr.	In.
22	15			II.	Tr.	In.		17	34	27.3	III.*	Ec.	Re.		22	34		I.	Sh.	Eg.
3	0	31		II.	Tr.	Eg.		20	54		III.	Oc.	Dis.		23	41		I.	Tr.	Eg.
6	32	8.0		I.	Ec.	Dis.		22	12		III.	Oc.	Re.	22	8	21	57.0	II.	Ec.	Dis.
9	55			I.	Oc.	Re.		23	59		I.	Sh.	In.		10	38	0.6	II.	Ec.	Re.
4	3	38		I.	Sh.	In.	18	1	11		I.	Tr.	In.		10	39		II.	Oc.	Dis.
4	52			I.	Tr.	In.		2	12		I.	Sh.	Eg.		12	53		II.*	Oc.	Re.
5	51			I.	Sh.	Eg.		3	22		I.	Tr.	Eg.		17	43	14.0	I.*	Ec.	Dis.
7	3			I.	Tr.	Eg.		11	35		II.	Sh.	In.		21	0		I.	Oc.	Re.
13	56	25.7		II.*	Ec.	Dis.		13	57		II.*	Sh.	Eg.	23	9	29		III.	Sh.	In.
16	12	43.1		II.*	Ec.	Re.		14	3		II.*	Tr.	In.		11	25		III.	Sh.	Eg.
16	24			II.*	Oc.	Dis.		16	17		II.*	Tr.	Eg.		14	22		III.*	Tr.	In.
18	40			II.*	Oc.	Re.		21	21	50.3	I.	Ec.	Dis.		14	49		I.*	Sh.	In.
5	1	0	23.0	I.	Ec.	Dis.	14	0	43		I.	Oc.	Re.		15	33		III.*	Tr.	Eg.
4	23			I.	Oc.	Re.		18	28		I.*	Sh.	In.		15	57		I.*	Tr.	In.
11	53	27.5		III.	Ec.	Dis.		19	39		I.	Tr.	In.		17	1		I.*	Sh.	Eg.
13	37	32.1		III.*	Ec.	Re.		20	41		I.	Sh.	Eg.		18	8		I.*	Tr.	Eg.
17	0			III.*	Oc.	Dis.		21	50		I.	Tr.	Eg.	24	3	26		II.	Sh.	In.
18	23			III.*	Oc.	Re.	15	5	47	31.3	II.	Ec.	Dis.		5	45		II.	Tr.	In.
22	6			I.	Sh.	In.		8	3	40.3	II.	Ec.	Re.		5	48		II.	Sh.	Eg.
23	20			I.	Tr.	In.		8	11		II.	Oc.	Dis.		7	58		II.	Tr.	Eg.
6	0	19		I.	Sh.	Eg.		10	25		II.	Oc.	Re.		12	11	34.0	I.*	Ec.	Dis.
1	31			I.	Tr.	Eg.		15	50	5.4	I.*	Ec.	Dis.		15	28		I.*	Oc.	Re.
9	1			II.	Sh.	In.		19	10		I.	Oc.	Re.	25	9	18		I.	Sh.	In.
11	23			II.	Sh.	Eg.	16	5	31		III.	Sh.	In.		10	25		I.	Tr.	In.
11	32			II.	Tr.	In.		7	29		III.	Sh.	Eg.		11	30		I.*	Sh.	Eg.
13	47			II.*	Tr.	Eg.		10	36		III.	Tr.	In.		12	36		I.*	Tr.	Eg.
19	28	41.6		I.	Ec.	Dis.		11	52		III.*	Tr.	Eg.		21	39	32.3	II.	Ec.	Dis.
22	51			I.	Oc.	Re.		12	56		I.*	Sh.	In.	26	2	7		II.	Oc.	Re.
7	16	34		I.*	Sh.	In.		14	7		I.*	Tr.	In.		6	39	49.8	I.	Ec.	Dis.
17	48			I.*	Tr.	In.		15	9		I.*	Sh.	Eg.		9	55		I.	Oc.	Re.
18	47			I.	Sh.	Eg.		16	18		I.*	Tr.	Eg.		23	47	29.0	III.	Ec.	Dis.
19	59			I.	Tr.	Eg.	17	0	52		II.	Sh.	In.	27	1	28	35.1	III.	Ec.	Re.
8	3	13	17.1	II.	Ec.	Dis.		3	14		II.	Sh.	Eg.		3	46		I.	Sh.	In.
5	29	31.5		II.	Ec.	Re.		3	17		II.	Tr.	In.		4	26		III.	Oc.	Dis.
5	40			II.	Oc.	Dis.		5	31		II.	Tr.	Eg.		4	52		I.	Tr.	In.
7	55			II.	Oc.	Re.		10	18	25.7	I.	Ec.	Dis.		5	35		III.	Oc.	Re.
13	56	56.7		I.*	Ec.	Dis.		13	38		I.*	Oc.	Re.		5	58		I.	Sh.	Eg.
17	19			I.*	Oc.	Re.		7	24		I.	Sh.	In.		7	3		I.	Tr.	Eg.
9	1	34		III.	Sh.	In.	18	8	35		I.	Tr.	In.		16	43		II.*	Sh.	In.
3	32			III.	Sh.	Eg.		9	37		I.	Sh.	Eg.		18	58		II.	Tr.	In.
6	46			III.	Tr.	In.		10	46		I.	Tr.	Eg.		19	4		II.	Sh.	Eg.
8	6			III.	Tr.	Eg.		19	4	58.4	II.	Ec.	Dis.		21	11		II.	Tr.	Eg.
11	3			I.	Sh.	In.		21	21	4.6	II.	Ec.	Re.	28	1	8	8.0	I.	Ec.	Dis.
12	16			I.	Tr.	In.		21	26		II.	Oc.	Dis.		4	22		I.	Oc.	Re.
13	16			I.*	Sh.	Eg.		23	40		II.	Oc.	Re.		22	15		I.	Sh.	In.
14	27			I.*	Tr.	Eg.	19	4	46	40.3	I.	Ec.	Dis.		23	19		I.	Tr.	In.
22	18			II.	Sh.	In.		8	5		I.	Oc.	Re.							

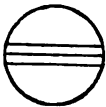
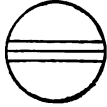
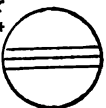
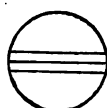
NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington

## WASHINGTON MEAN TIME.

FEBRUARY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.	d * 	III.	d r * * 
II.	d r * * 	IV. No Eclipse.	

*Configurations at 15<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1				○	3 <sup>h</sup>	4 <sup>h</sup>	I ●	
2		3 <sup>h</sup>	I <sup>h</sup>	○	2 <sup>h</sup>		4 <sup>h</sup>	
3		3 <sup>h</sup>	2 <sup>h</sup>	○	I <sup>h</sup>		4 <sup>h</sup>	
4		3 <sup>h</sup>	I <sup>h</sup>	2○			4 <sup>h</sup>	
5			3 <sup>h</sup>	○	I <sup>h</sup>	2 <sup>h</sup>	4 <sup>h</sup>	
6			I <sup>h</sup> 2 <sup>h</sup>	○		4 <sup>h</sup>		
7		2 <sup>h</sup>		○	I <sup>h</sup>		3 <sup>h</sup>	
8		4 <sup>h</sup>		○	2 <sup>h</sup> 3 <sup>h</sup>			I ●
9	4 <sup>h</sup>	3 <sup>h</sup>	2 <sup>h</sup>	○	I <sup>h</sup>			
10	4 <sup>h</sup>	3 <sup>h</sup>	2 <sup>h</sup>	○	I <sup>h</sup>			
11	4 <sup>h</sup>	3 <sup>h</sup>	I <sup>h</sup> 2 <sup>h</sup>	○				
12	4 <sup>h</sup>		3 <sup>h</sup>	○	I <sup>h</sup> 2 <sup>h</sup>			
13	○ 2 <sup>h</sup>	4 <sup>h</sup>		I <sup>h</sup> ○		3 <sup>h</sup>		
14		4 <sup>h</sup> 2 <sup>h</sup>		○	I <sup>h</sup>		3 <sup>h</sup>	
15			4 <sup>h</sup> I <sup>h</sup>	○	2 <sup>h</sup> 3 <sup>h</sup>			
16	○ I <sup>h</sup>		3 <sup>h</sup>	○	4 <sup>h</sup> 2 <sup>h</sup>			
17		3 <sup>h</sup> 2 <sup>h</sup>		○	I <sup>h</sup>		4 <sup>h</sup>	
18		3 <sup>h</sup>	I <sup>h</sup>	○			4 <sup>h</sup>	
19			3 <sup>h</sup>	○	I <sup>h</sup> 2 <sup>h</sup>			4 <sup>h</sup>
20			I <sup>h</sup>	○ 2 <sup>h</sup>		3 <sup>h</sup>		4 <sup>h</sup>
21		2 <sup>h</sup>		○	I <sup>h</sup>		3 <sup>h</sup> 4 <sup>h</sup>	
22			I <sup>h</sup>	○	2 <sup>h</sup>	3 <sup>h</sup> 4 <sup>h</sup>		
23	○ 3 <sup>h</sup>			○ I <sup>h</sup>		4 <sup>h</sup>		
24		3 <sup>h</sup> 2 <sup>h</sup> 4 <sup>h</sup>		○				I ●
25		3 <sup>h</sup> 4 <sup>h</sup>	2 <sup>h</sup> I <sup>h</sup>	○				
26		4 <sup>h</sup>	3 <sup>h</sup>	○	I <sup>h</sup> 2 <sup>h</sup>			
27	4 <sup>h</sup>		I <sup>h</sup>	○	2 <sup>h</sup> 3 <sup>h</sup>			
28	4 <sup>h</sup>		2 <sup>h</sup>	○	I <sup>h</sup>		3 <sup>h</sup>	

## WASHINGTON MEAN TIME.

## MARCH.

d	h	m	s				d	h	m	s				d	h	m	s			
1	0	27		I.	Sh.	Eg.	11	14	1		I.*	Tr.	In.	22	3	55		I.	Sh.	In.
	1	30		I.	Tr.	Eg.		15	17		I.*	Sh.	Eg.		4	41		I.	Tr.	In.
	10	56	35.0	II.	Ec.	Dis.		16	12		I.*	Tr.	Eg.		6	7		I.	Sh.	Eg.
	15	19		II.*	Oc.	Re.	12	2	49	17.5	II.	Ec.	Dis.		6	52		I.	Tr.	Eg.
	19	36	23.8	I.	Ec.	Dis.		6	55		II.	Oc.	Re.		18	41	47.0	II.	Ec.	Dis.
	22	49		I.	Oc.	Re.		10	26	12.8	I.*	Ec.	Dis.		22	25		II.	Oc.	Re.
2	13	26		III.*	Sh.	In.		13	30		I.*	Oc.	Re.	23	1	16	6.5	I.	Ec.	Dis.
	15	22		III.*	Sh.	Eg.	13	7	33		I.	Sh.	In.		4	9		I.	Oc.	Re.
	16	43		I.*	Sh.	In.		7	42	52.5	III.	Ec.	Dis.		22	23		I.	Sh.	In.
	17	46		I.*	Tr.	In.		8	28		I.	Tr.	In.		23	7		I.	Tr.	In.
	18	3		III.*	Tr.	In.		9	22	3.5	III.	Ec.	Re.	24	0	35		I.	Sh.	Eg.
	18	55		I.	Sh.	Eg.		9	45		I.	Sh.	Eg.		1	18		I.	Tr.	Eg.
	19	10		III.	Tr.	Eg.		10	39		I.*	Tr.	Eg.		1	21		III.	Sh.	In.
	19	57		I.	Tr.	Eg.		11	40		III.*	Oc.	Dis.		3	14		III.	Sh.	Eg.
3	6	0		II.	Sh.	In.		12	40		III.*	Oc.	Re.		4	40		III.	Tr.	In.
	8	10		II.	Tr.	In.		21	51		II.	Sh.	In.		5	39		III.	Tr.	Eg.
	8	21		II.	Sh.	Eg.		23	43		II.	Tr.	In.		13	41		II.*	Sh.	In.
	10	23		II.	Tr.	Eg.	14	0	12		II.	Sh.	Eg.		15	11		II.*	Tr.	In.
	14	4	44.4	I.*	Ec.	Dis.		1	55		II.	Tr.	Eg.		16	2		II.*	Sh.	Eg.
	17	16		I.*	Oc.	Re.		4	54	32.0	I.	Ec.	Dis.		17	23		II.*	Tr.	Eg.
4	11	11		I.*	Sh.	In.		7	57		I.	Oc.	Re.		19	44	29.0	I.	Ec.	Dis.
	12	13		I.*	Tr.	In.	15	2	1		I.	Sh.	In.		22	35		I.	Oc.	Re.
	13	23		I.*	Sh.	Eg.		2	55		I.	Tr.	In.		25	16	52	I.*	Sh.	In.
	14	24		I.*	Tr.	Eg.		4	13		I.	Sh.	Eg.		17	33		I.	Tr.	In.
5	0	14	18.4	II.	Ec.	Dis.		5	6		I.	Tr.	Eg.		19	4		I.	Sh.	Eg.
	4	32		II.	Oc.	Re.		16	6	29.5	II.*	Ec.	Dis.		19	44		I.	Tr.	Eg.
	8	33	0.4	I.	Ec.	Dis.		20	5		II.	Oc.	Re.	26	7	59	56.5	II.	Ec.	Dis.
	11	43		I.	Oc.	Re.		23	22	49.0	I.	Ec.	Dis.		11	35		II.*	Oc.	Re.
6	3	45	12.1	III.	Ec.	Dis.	16	2	23		I.	Oc.	Re.		14	12	47.8	I.*	Ec.	Dis.
	5	25	20.1	III.	Ec.	Re.		20	29		I.	Sh.	In.		17	2		I.*	Oc.	Re.
	5	39		I.	Sh.	In.		21	21		I.	Tr.	In.	27	11	20		I.*	Sh.	In.
	6	40		I.	Tr.	In.		21	22		III.	Sh.	In.		11	59		I.*	Tr.	In.
	7	51		I.	Sh.	Eg.		22	42		I.	Sh.	Eg.		13	32		I.*	Sh.	Eg.
	8	5		III.	Oc.	Dis.		23	16		III.	Sh.	Eg.		14	10		I.*	Tr.	Eg.
	8	50		I.	Tr.	Eg.		23	32		I.	Tr.	Eg.		15	38	4.5	III.*	Ec.	Dis.
	9	10		III.	Oc.	Re.	17	1	13		III.	Tr.	In.		17	15	27.5	III.*	Ec.	Re.
	19	17		II.	Sh.	In.		2	12		III.	Tr.	Eg.		18	33		III.	Oc.	Dis.
	21	21		II.	Tr.	In.		11	7		II.*	Sh.	In.		19	32		III.	Oc.	Re.
	21	38		II.	Sh.	Eg.		12	53		II.*	Tr.	In.	28	2	58		II.	Sh.	In.
	23	34		II.	Tr.	Eg.		13	28		II.*	Sh.	Eg.		4	19		II.	Tr.	In.
7	3	1	18.8	I.	Ec.	Dis.		15	5		II.*	Tr.	Eg.		5	19		II.	Sh.	Eg.
	6	10		I.	Oc.	Re.		17	51	10.8	I.	Ec.	Dis.		6	31		II.	Tr.	Eg.
8	0	8		I.	Sh.	In.		20	50		I.	Oc.	Re.		8	41	8.6	I.	Ec.	Dis.
	1	7		I.	Tr.	In.	18	14	58		I.*	Sh.	In.		11	28		I.*	Oc.	Re.
	2	20		I.	Sh.	Eg.		15	48		I.*	Tr.	In.	29	5	49		I.	Sh.	In.
	3	18		I.	Tr.	Eg.		17	10		I.*	Sh.	Eg.		6	26		I.	Tr.	In.
	13	31	25.6	II.*	Ec.	Dis.		17	59		I.	Tr.	Eg.		8	1		I.	Sh.	Eg.
	17	43		II.*	Oc.	Re.	19	5	24	30.3	II.	Ec.	Dis.		8	36		I.	Tr.	Eg.
	21	29	35.0	I.	Ec.	Dis.		9	16		II.	Oc.	Re.		21	17	18.5	II.	Ec.	Dis.
9	0	37		I.	Oc.	Re.		12	19	28.6	I.*	Ec.	Dis.	30	0	44		II.	Oc.	Re.
	17	24		III.*	Sh.	In.		15	16		I.*	Oc.	Re.		3	9	28.2	I.	Ec.	Dis.
	18	36		I.	Sh.	In.	20	9	26		I.	Sh.	In.		5	54		I.	Oc.	Re.
	19	19		III.	Sh.	Eg.		10	15		I.*	Tr.	In.	31	0	17		I.	Sh.	In.
	19	34		I.	Tr.	In.		11	38		I.*	Sh.	Eg.		0	53		I.	Tr.	In.
	20	48		I.	Sh.	Eg.		11	40	23.5	III.*	Ec.	Dis.		2	29		I.	Sh.	Eg.
	21	40		III.	Tr.	In.		12	26		I.*	Tr.	Eg.		3	3		I.	Tr.	Eg.
	21	45		I.	Tr.	Eg.		13	18	40.1	III.*	Ec.	Re.		5	19		III.	Sh.	In.
	22	42		III.	Tr.	Eg.		15	8		III.*	Oc.	Dis.		7	11		III.	Sh.	Eg.
10	8	34		II.	Sh.	In.		16	7		III.*	Oc.	Re.		8	3		III.	Tr.	In.
	10	32		II.*	Tr.	In.	21	0	24		II.	Sh.	In.		9	2		III.*	Tr.	Eg.
	10	55		II.*	Sh.	Eg.		2	2		II.	Tr.	In.		16	15		II.*	Sh.	In.
	12	44		II.*	Tr.	Eg.		2	45		II.	Sh.	Eg.		17	27		II.	Tr.	In.
	15	57	56.1	I.*	Ec.	Dis.		4	14		II.	Tr.	Eg.		18	35		II.	Sh.	Eg.
	19	4		I.	Oc.	Re.		6	47	48.5	I.	Ec.	Dis.		19	39		II.	Tr.	Eg.
11	13	5		I.*	Sh.	In.		9	43		I.*	Oc.	Re.		21	37	51.7	I.	Ec.	Dis.

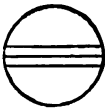
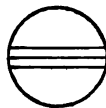
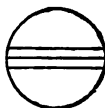
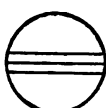
NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

MARCH.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I d * 	III. d r * * 
II. d * 	IV. No Eclipse. 

*Configurations at 14<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1	'4		'1	○		3'		'2 ●
2		'4		○	3' 1'	2'		
3			'4 3'	2' '1	○			
4	○ 1'		'3	'2	'4	○		
5			'3			○	'1	'4
6				1'	○	'3 2'		'4
7			2'		○	'1	'3	'4
8			'1	'2	○		3'	'4
9					○	'1	2'	'4
10			3'	'12'	○			'4
11		3'	'2		○ 1'		4'	
12			'3		○ '1	4' 2'		
13				4' 1'	○ '3	2'		
14		4'	2'		○	'1	'3	
15		4'		1' '2	○		3'	
16	4'				○	'1	'2	
17	○ 2' '4		3'	'1	○			
18		'4	3'	'2	○	1'		
19			'4	'3	○	'2		'1 ●
20				'4	1' ○	2'		'3 ●
21			2'		○ '4	'1	'3	
22				1' 2'	○		'4 3'	
23					○	1' 3' '2		'4
24				'1	○ 2'			'4
25		3'	'2		○	1'		'4
26			'3		'1 ○	'2		'4
27	○ 1'			'3	○	2'		'4
28			2'		○	'1	'3	'4
29			'1		○ 4'		3'	
30			4'		○	'1	'3	
31		4'		'1 3'	○	2'		

## WASHINGTON MEAN TIME.

## APRIL.

d	h	m	s				d	h	m	s				d	h	m	s			
1	0	20			I.	Oc.	Re.	11	2	14			III.	21	8	16			I.*	Tr.
	18	45			I.	Sh.	In.		8	6			II.		17	13			III.	Sh.
	19	19			I.	Tr.	In.		8	48			II.*		17	53			III.	Tr.
	20	57			I.	Sh.	Eg.		10	26			II.*		19	1			III.	Tr.
	21	29			I.	Tr.	Eg.		11	1			II.*		19	4			III.	Sh.
2	10	35	36.8		II.*	Ec.	Dis.		12	28	4.8		I.*		23	56			II.	Sh.
	13	53			II.*	Oc.	Re.		14	56			I.*		22	0	9		II.	Tr.
	16	6	12.1		I.*	Ec.	Dis.		12	9	35		I.*			2	16		II.	Sh.
	18	46			I.	Oc.	Re.		9	55			I.*			2	22		II.	Tr.
3	13	14			I.*	Sh.	In.		11	49			I.*		3	18	32.5		I.	Ec.
	13	45			I.*	Tr.	In.		12	6			I.*			5	32		I.	Oc.
	15	26			I.*	Sh.	Eg.		13	2	29	4.3	II.		23	0	27		I.	Sh.
	15	55			I.*	Tr.	Eg.		5	18			II.			0	31		I.	Tr.
	19	36	22.1		III.	Ec.	Dis.		6	56	27.1		I.			2	39		I.	Sh.
	21	12	51.5		III.	Ec.	Re.		9	22			I.*			2	42		I.	Tr.
	21	54			III.	Oc.	Dis.		14	4	4		I.			18	24	1.0	II.	Ec.
	22	53			III.	Oc.	Re.		4	21			I.			20	42		II.	Oc.
4	5	32			II.	Sh.	In.		6	17			I.			21	47		I.	Oc.
	6	34			II.	Tr.	In.		6	32			I.			23	58		I.	Oc.
	7	52			II.	Sh.	Eg.		13	15			III.*		24	18	55		I.	Sh.
	8	46			II.*	Tr.	Eg.		14	39			III.*			18	57		I.	Tr.
	10	34	34.2		I.*	Ec.	Dis.		15	6			III.*			21	7		I.	Sh.
	13	12			I.*	Oc.	Re.		15	42			III.*			21	8		I.	Tr.
5	7	42			I.	Sh.	In.		21	22			II.		25	7	31	34.8	III.	Ec.
	8	11			I.	Tr.	In.		21	55			II.			9	5	35.6	III.*	Ec.
	9	54			I.*	Sh.	Eg.		23	42			II.			13	13		II.*	Sh.
	10	21			I.*	Tr.	Eg.		15	0	8		II.			13	15		II.*	Tr.
	23	53	4.3		II.	Ec.	Dis.		1	24	53.0		I.			15	28		II.*	Tr.
6	3	1			II.	Oc.	Re.		3	48			I.			15	33		II.*	Sh.
	5	2	54.8		I.	Ec.	Dis.		22	32			I.			16	13		I.*	Oc.
	7	38			I.	Oc.	Re.		22	47			I.			18	23		I.	Oc.
7	2	10			I.	Sh.	In.		16	0	46		I.		26	13	23		I.*	Tr.
	2	37			I.	Tr.	In.		0	58			I.			13	24		I.*	Sh.
	4	23			I.	Sh.	Eg.		15	47	39.6		II.*			15	34		I.*	Tr.
	4	47			I.	Tr.	Eg.		18	26			II.			15	36		I.*	Sh.
	9	17			III.*	Sh.	In.		19	53	16.6		I.		27	7	36		II.*	Oc.
	11	9			III.*	Sh.	Eg.		22	14			I.			9	57	14.5	II.*	Ec.
	11	23			III.*	Tr.	In.		17	17	1		I.			10	39		I.*	Oc.
	12	23			III.*	Tr.	Eg.		17	13			I.			12	51	2.0	I.*	Ec.
	18	49			II.	Sh.	In.		19	14			I.		28	7	49		I.*	Tr.
	19	41			II.	Tr.	In.		19	24			I.			7	53		I.*	Sh.
	21	9			II.	Sh.	Eg.		18	3	33	20.8	III.			10	0		I.*	Tr.
	21	53			II.	Tr.	Eg.		5	33			III.			10	5		I.*	Sh.
	23	31	19.7		I.	Ec.	Dis.		10	39			II.*			21	8		III.	Tr.
8	2	4			I.	Oc.	Re.		11	2			II.*			21	12		III.	Sh.
	20	39			I.	Sh.	In.		12	59			II.*			22	21		III.	Tr.
	21	3			I.	Tr.	In.		13	15			II.*			23	2		III.	Sh.
	22	52			I.	Sh.	Eg.		14	21	41.3		I.*		29	2	21		II.	Tr.
	23	13			I.	Tr.	Eg.		16	40			I.*			2	29		II.	Sh.
9	13	11	31.2		II.*	Ec.	Dis.		19	11	30		I.*			4	34		II.	Tr.
	16	10			II.*	Oc.	Re.		11	39			I.*			4	50		II.	Sh.
	17	59	41.6		I.	Ec.	Dis.		13	42			I.*			5	4		I.	Oc.
	20	30			I.	Oc.	Re.		13	50			I.*			7	19	29.8	I.*	Ec.
10	15	7			I.*	Sh.	In.		20	5	5	18.0	II.		30	2	15		I.	Tr.
	15	29			I.*	Tr.	In.		7	33			II.			2	22		I.	Sh.
	17	20			I.	Sh.	Eg.		8	50	5.2		I.*			4	26		I.	Tr.
	17	40			I.	Tr.	Eg.		11	6			I.*			4	34		I.	Sh.
	23	34	33.3		III.	Ec.	Dis.		21	5	58		I.			20	44		II.	Oc.
11	1	10	11.1		III.	Ec.	Re.		6	5			I.			23	16	3.0	II.	Ec.
	1	12			III.	Oc.	Dis.		8	10			I.			23	30		I.	Oc.

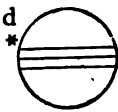
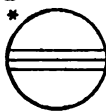
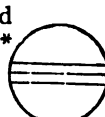
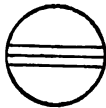
NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

APRIL.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		III.	
II.		IV. No Eclipse.	

*Configurations at 12<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1		4'	3'	2'	○	1'		
2	4'		3'	1'	○			2' ●
3		4'		3'	○	1'	2'	
4		4'		2'	○		3'	1' ●
5			4'	2'	○		1'	3'
6				4'	○	1'	2'	3'
7	○ 3'			1'	○	4'		
8			3'	2'	○	1'		4'
9			3'		○	1'	2'	
10				3'	○	1'	2'	
11					○	3'		4'
12			2'	1'	○		3'	4'
13					○	1'	2'	3'
14				1'	○	3'	2'	4'
15			3'	2'	○		1'	
16			3'	4'	○		1'	2'
17		4'		3'	○	1'		2'
18	○ 2'	4'			○	3'		
19	○ 1'	4'		2'	○			3'
20		4'			○	1'	2'	3'
21			4'		○	3'	2'	
22				4' 3'	○		1'	
23			3'		○		1'	2'
24				3'	○	1'		4'
25					○	2'	3'	
26			2'		○	1'		3'
27					○	2'		3'
28				1'	○	3'	2'	
29			3'	2'	○		1'	
30			3'		○			4'



## WASHINGTON MEAN TIME.

MAY.

d	h	m	s				d	h	m	s				d	h	m	s			
1	1	47	56.6	I.	Ec.	Re.	12	11	17		I.*	Tr.	In.	22	4	43		I.	Oc.	Dis.
20	41			I.	Tr.	In.		11	42		I.*	Sh.	In.		7	6	40.0	II.	Ec.	Re.
20	50			I.	Sh.	In.		13	29		I.*	Tr.	Eg.		7	29	53.2	I.	Ec.	Re.
22	52			I.	Tr.	Eg.		13	54		I.*	Sh.	Eg.		23	1	57	I.	Tr.	In.
23	24			I.	Sh.	Eg.	13	3	39		III.	Tr.	In.		2	34		I.	Sh.	In.
2	10	55		III.*	Oc.	Dis.		5	4		III.	Tr.	Eg.		4	9		I.	Tr.	Eg.
13	3	6.4		III.*	Ec.	Re.		5	11		III.	Sh.	In.		4	46		I.	Sh.	Eg.
15	27			II.*	Tr.	In.		6	47		II.	Tr.	In.		20	45		III.	Oc.	Dis.
15	46			II.*	Sh.	In.		6	59		III.	Sh.	Eg.		22	9		II.	Tr.	In.
17	41			II.	Tr.	Eg.		7	37		II.*	Sh.	In.		22	19		III.	Oc.	Re.
17	56			I.	Oc.	Dis.		8	32		I.*	Oc.	Dis.		23	10		I.	Oc.	Dis.
18	6			II.	Sh.	Eg.		9	2		II.*	Tr.	Eg.		23	25	31.0	III.	Ec.	Dis.
20	16	23.5		I.	Ec.	Re.		9	57		II.*	Sh.	Eg.		23	28		II.	Sh.	In.
3	15	7		I.*	Tr.	In.		11	7	16.7	I.*	Ec.	Re.		24	0	26	II.	Tr.	Eg.
15	19			I.*	Sh.	In.	14	5	43		I.	Tr.	In.		0	56	34.1	III.	Ec.	Re.
17	18			I.	Tr.	Eg.		6	11		I.	Sh.	In.		1	48		II.	Sh.	Eg.
17	31			I.	Sh.	Eg.		7	55		I.*	Tr.	Eg.		1	58	25.0	I.	Ec.	Re.
4	9	51		II.*	Oc.	Dis.		8	23		I.*	Sh.	Eg.		20	23		I.	Tr.	In.
12	22			I.*	Oc.	Dis.	15	1	17		II.	Oc.	Dis.		21	3		I.	Sh.	In.
12	33	50.1		II.*	Ec.	Re.		2	58		I.	Oc.	Dis.		22	35		I.	Tr.	Eg.
14	44	50.2		I.*	Ec.	Re.		4	29	38.0	II.	Ec.	Re.		23	15		I.	Sh.	Eg.
5	9	33		I.*	Tr.	In.		5	35	47.5	I.	Ec.	Re.		25	16	44	II.	Oc.	Dis.
9	47			I.*	Sh.	In.	16	0	9		I.	Tr.	In.		17	36		I.	Oc.	Dis.
11	44			I.*	Tr.	Eg.		0	39		I.	Sh.	In.		20	24	40.2	II.	Ec.	Re.
11	59			I.*	Sh.	Eg.		2	21		I.	Tr.	Eg.		20	26	57.2	I.	Ec.	Re.
6	0	22		III.	Tr.	In.		2	51		I.	Sh.	Eg.		26	14	49	I.	Tr.	In.
1	11			III.	Sh.	In.		17	25		III.	Oc.	Dis.		15	31		I.	Sh.	In.
1	42			III.	Tr.	Eg.		18	54		III.	Oc.	Re.		17	1		I.	Tr.	Eg.
3	0			III.	Sh.	Eg.		19	26	28.4	III.	Ec.	Dis.		17	43		I.	Sh.	Eg.
4	33			II.	Tr.	In.		19	54		II.	Tr.	In.		27	10	18	III.*	Tr.	In.
5	3			II.	Sh.	In.		20	54		II.	Sh.	In.		11	17		II.*	Tr.	In.
6	48			I.	Oc.	Dis.		20	58	13.6	III.	Ec.	Re.		11	55		III.*	Tr.	Eg.
6	48			II.	Tr.	Eg.		21	25		I.	Oc.	Dis.		12	3		I.*	Oc.	Dis.
7	23			II.	Sh.	Eg.		22	10		II.	Tr.	Eg.		12	45		II.*	Sh.	In.
9	13	19.8		I.*	Ec.	Re.		23	14		II.	Sh.	Eg.		13	9		III.*	Sh.	In.
7	3	59		I.	Tr.	In.	17	0	4	17.7	I.	Ec.	Re.		13	35		II.*	Tr.	Eg.
4	16			I.	Sh.	In.		18	36		I.	Tr.	In.		14	55		III.	Sh.	Eg.
6	10			I.	Tr.	Eg.		19	8		I.	Sh.	In.		14	55	31.1	I.	Ec.	Re.
6	28			I.	Sh.	Eg.		20	48		I.	Tr.	Eg.		15	5		II.	Sh.	Eg.
23	0			II.	Oc.	Dis.		21	20		I.	Sh.	Eg.		28	9	16	I.*	Tr.	In.
8	1	14		I.	Oc.	Dis.	18	14	25		II.*	Oc.	Dis.		10	0		I.*	Sh.	In.
1	52	45.4		II.	Ec.	Re.		15	51		I.	Oc.	Dis.		11	28		I.*	Tr.	Eg.
3	41	48.6		I.	Ec.	Re.		17	47	34.3	II.	Ec.	Re.		12	12		I.*	Sh.	Eg.
22	25			I.	Tr.	In.		18	32	48.1	I.	Ec.	Re.		29	5	54	II.	Oc.	Dis.
22	45			I.	Sh.	In.	19	13	3		I.*	Tr.	In.		6	29		I.	Oc.	Dis.
9	0	37		I.	Tr.	Eg.		13	37		I.*	Sh.	In.		9	24	5.2	I.*	Ec.	Re.
0	57			I.	Sh.	Eg.		15	15		I.	Tr.	Eg.		9	43	49.5	II.*	Ec.	Re.
14	9			III.*	Oc.	Dis.		15	49		I.	Sh.	Eg.		30	3	43	I.	Tr.	In.
17	0	33.2		III.	Ec.	Re.	20	6	57		III.	Tr.	In.		4	29		I.	Sh.	In.
17	40			II.	Tr.	In.		8	28		III.*	Tr.	Eg.		5	55		I.	Tr.	Eg.
18	20			II.	Sh.	In.		9	1		II.*	Tr.	In.		6	41		I.	Sh.	Eg.
19	40			I.	Oc.	Dis.		9	10		III.*	Sh.	In.		31	0	8	III.	Oc.	Dis.
19	55			II.	Tr.	Eg.		10	11		II.*	Sh.	In.		0	26		II.	Tr.	In.
20	40			II.	Sh.	Eg.		10	17		I.*	Oc.	Dis.		0	56		I.	Oc.	Dis.
22	10	17.2		I.	Ec.	Re.		10	57		III.*	Sh.	Eg.		1	47		III.	Oc.	Re.
10	16	51		I.	Tr.	In.		11	17		II.*	Tr.	Eg.		2	2		II.	Sh.	In.
17	14			I.	Sh.	In.		12	31		II.*	Sh.	Eg.		2	44		II.	Tr.	Eg.
19	3			I.	Tr.	Eg.		13	1	20.6	I.*	Ec.	Re.		3	24	26.0	III.	Ec.	Dis.
19	26			I.	Sh.	Eg.	21	7	30		I.	Tr.	In.		3	52	38.5	I.	Ec.	Re.
11	12	8		II.*	Oc.	Dis.		8	6		I.*	Sh.	In.		4	22		II.	Sh.	Eg.
14	6			I.*	Oc.	Dis.		9	42		I.*	Tr.	Eg.		4	54	49.3	III.	Ec.	Re.
15	10	37.4		II.*	Ec.	Re.		10	18		I.*	Sh.	Eg.		22	10		I.	Tr.	In.
16	38	45.8		I.	Ec.	Re.	22	3	35		II.	Oc.	Dis.		22	58		I.	Sh.	In.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

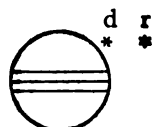
MAY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

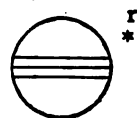
I.



III.



II.



IV. No Eclipse.

*Configurations at 11<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.	East.
1	'3	○ 4' 1' '2
2		○ 2' '3 ●
3	4' 2'	○ 1' '3
4	4' '1	○ 3' '2 ●
5	○ 1' 4'	○ 3' 2'
6	'4	○ '1
7	'4 3' '2 1'	○
8	'4 '3	○ '1 '2
9	'4 '1 '3	○ 2'
10	2'	○ '4 1' '3
11	'1 '2	○ '4 3'
12	○ 1'	○ '4
13	'3' '2 1'	○ '1 '4
14	'3	○ '1 '4
15	1' '3	○ 2' 4'
16	2'	○ 1' '4
17	'1 '2	○ '3
18	4'	○ 1' '3
19	○ 2' 4' 3'	○ '1 ●
20	4' 3' '2 1'	○
21	4' '3	○ '1
22	'4	○ 2' '1
23	'4 2'	○ 1' '3
24	'4 '1	○ '3
25	'4	○ 1' '2 3'
26	'1	○ '4
27	○ 2' ○ 3'	○ '4
28	○ 1' 3' '2	○ '4
29	'3	○ '1 '4
30	'3 1'	○ 2' '4
31	2'	○ '1 4'

## WASHINGTON MEAN TIME.

## JUNE.

d	h	m	s				d	h	m	s				d	h	m	s			
1	0	22		I.	Tr.	Eg.	10	22	52		III.	Sh.	Eg.	21	10	41		III.*	Oc.	Dis.
	1	10		I.	Sh.	Eg.	11	12	52		I.*	Tr.	In.		12	5		II.*	Sh.	Eg.
	19	4		II.	Oc.	Dis.		13	51		I.	Sh.	In.		12	34		III.*	Oc.	Re.
	19	23		I.	Oc.	Dis.		15	4		I.	Tr.	Eg.		15	21	42.0	III.	Ec.	Dis.
	22	21	12.3	I.	Ec.	Re.		16	3		I.	Sh.	Eg.		16	50	20.0	III.	Ec.	Re.
	23	1	53.0	II.	Ec.	Re.	12	10	4		I.*	Oc.	Dis.	22	3	36		I.	Tr.	In.
2	16	37		I.	Tr.	In.		10	40		II.*	Oc.	Dis.		4	43		I.	Sh.	In.
	17	27		I.	Sh.	In.		13	12	46.6	I.*	Ec.	Re.		5	49		I.	Tr.	Eg.
	18	49		I.	Tr.	Eg.		14	58	25.0	II.	Ec.	Re.		6	55		I.	Sh.	Eg.
	19	39		I.	Sh.	Eg.	13	7	19		I.	Tr.	In.	23	0	47		I.	Oc.	Dis.
3	13	36		II.*	Tr.	In.		8	19		I.*	Sh.	In.		2	19		II.	Oc.	Dis.
	13	44		III.*	Tr.	In.		9	31		I.*	Tr.	Eg.		4	4	29.2	I.	Ec.	Re.
	13	49		I.*	Oc.	Dis.		10	31		I.*	Sh.	Eg.		6	53	57.2	II.	Ec.	Re.
	15	19		II.	Sh.	In.	14	4	31		I.	Oc.	Dis.		22	4		I.	Tr.	In.
	15	24		III.	Tr.	Eg.		5	7		II.	Tr.	In.		23	12		I.	Sh.	In.
	15	54		II.	Tr.	Eg.		7	6		III.	Oc.	Dis.	24	0	17		I.	Tr.	Eg.
	16	49	47.5	I.	Ec.	Re.		7	11		II.	Sh.	In.		1	24		I.	Sh.	Eg.
	17	8		III.	Sh.	In.		7	27		II.	Tr.	Eg.		19	15		I.	Oc.	Dis.
	17	39		II.	Sh.	Eg.		7	41	22.2	I.	Ec.	Re.		20	43		II.	Tr.	In.
	18	54		III.	Sh.	Eg.		8	55		III.*	Oc.	Re.		22	33	7.4	I.	Ec.	Re.
4	11	3		I.*	Tr.	In.		9	31		II.*	Sh.	Eg.		23	3		II.	Sh.	In.
	11	55		I.*	Sh.	In.		11	22	49.5	III.*	Ec.	Dis.		23	3		II.	Tr.	Eg.
	13	15		I.*	Tr.	Eg.		12	52	1.0	III.*	Ec.	Re.	25	0	24		III.	Tr.	In.
	14	7		I.*	Sh.	Eg.	15	1	46		I.	Tr.	In.		1	23		II.	Sh.	Eg.
5	8	16		II.*	Oc.	Dis.		2	48		I.	Sh.	In.		2	19		III.	Tr.	Eg.
	8	16		I.*	Oc.	Dis.		3	58		I.	Tr.	Eg.		5	6		III.	Sh.	In.
	11	18	23.4	I.*	Ec.	Re.		5	0		I.	Sh.	Eg.		6	50		III.	Sh.	Eg.
	12	21	5.1	II.*	Ec.	Re.		22	58		I.	Oc.	Dis.		16	32		I.	Tr.	In.
6	5	30		I.	Tr.	In.		23	52		II.	Oc.	Dis.		17	40		I.	Sh.	In.
	6	24		I.	Sh.	In.	16	2	9	59.0	I.	Ec.	Re.		18	45		I.	Tr.	Eg.
	7	42		I.	Tr.	Eg.		4	16	33.3	II.	Ec.	Re.		19	52		I.	Sh.	Eg.
	8	36		I.*	Sh.	Eg.		20	14		I.	Tr.	In.	26	13	43		I.	Oc.	Dis.
7	2	43		I.	Oc.	Dis.		21	17		I.	Sh.	In.		15	33		II.	Oc.	Dis.
	2	46		II.	Tr.	In.		22	26		I.	Tr.	Eg.		17	1	47.6	I.	Ec.	Re.
	3	36		III.	Oc.	Dis.		23	29		I.	Sh.	Eg.		17	54		II.	Oc.	Re.
	4	36		II.	Sh.	In.	17	17	25		I.	Oc.	Dis.		17	57	51.6	II.	Ec.	Dis.
	5	4		II.	Tr.	Eg.		18	18		II.	Tr.	In.		20	13	10.6	II.	Ec.	Re.
	5	19		III.	Oc.	Re.		20	28		II.	Sh.	In.	27	11	0		I.*	Tr.	In.
	5	46	58.0	I.	Ec.	Re.		20	38		II.	Tr.	Eg.		12	9		I.*	Tr.	In.
	6	56		II.	Sh.	Eg.		20	38	36.2	I.	Ec.	Re.		13	13		I.	Tr.	Eg.
	7	23	55.0	III.	Ec.	Dis.		20	46		III.	Tr.	In.		14	21		I.	Sh.	Eg.
	8	53	41.1	III.	Ec.	Re.		22	37		III.	Tr.	Eg.	28	8	10		I.*	Oc.	Dis.
	23	57		I.	Tr.	In.		22	48		II.	Sh.	Eg.		9	56		II.*	Tr.	In.
8	0	53		I.	Sh.	In.	18	1	7		III.	Sh.	In.		11	30	25.3	I.*	Ec.	Re.
	2	9		I.	Tr.	Eg.		2	51		III.	Sh.	Eg.		12	17		II.*	Tr.	Eg.
	3	5		I.	Sh.	Eg.		14	41		I.	Tr.	In.		12	20		II.*	Sh.	In.
	21	10		I.	Oc.	Dis.		15	45		I.	Sh.	In.		14	21		III.	Oc.	Dis.
	21	27		II.	Oc.	Dis.		16	54		I.	Tr.	Eg.		14	40		II.	Sh.	Eg.
9	0	15	33.0	I.	Ec.	Re.		17	57		I.	Sh.	Eg.		16	18		III.	Oc.	Re.
	1	39	11.2	II.	Ec.	Re.	19	11	53		I.*	Oc.	Dis.		19	20	29.0	III.	Ec.	Dis.
	18	24		I.	Tr.	In.		13	5		II.*	Oc.	Dis.		20	48	34.0	III.	Ec.	Re.
	19	22		I.	Sh.	In.		15	7	15.0	I.	Ec.	Re.	29	5	28		I.	Tr.	In.
	20	36		I.	Tr.	Eg.		17	35	47.5	II.	Ec.	Re.		6	38		I.	Sh.	In.
	21	34		I.	Sh.	Eg.	20	9	8		I.*	Tr.	In.		7	41		I.	Tr.	Eg.
10	15	37		I.	Oc.	Dis.		10	14		I.*	Sh.	In.		8	50		I.*	Sh.	Eg.
	15	56		II.	Tr.	In.		11	21		I.*	Tr.	Eg.	30	2	38		I.	Oc.	Dis.
	17	12		III.	Tr.	In.		12	26		I.*	Sh.	Eg.		4	48		II.	Oc.	Dis.
	17	54		II.	Sh.	In.	21	6	20		I.	Oc.	Dis.		5	59	4.2	I.	Ec.	Re.
	18	15		II.	Tr.	Eg.		7	30		II.	Tr.	In.		7	9		II.	Oc.	Re.
	18	44	9.1	I.	Ec.	Re.		9	35	51.7	I.*	Ec.	Re.		7	16	2.3	II.	Ec.	Dis.
	18	58		III.	Tr.	Eg.		9	45		II.*	Sh.	In.		9	31	20.7	II.*	Ec.	Re.
	20	14		II.	Sh.	Eg.		9	50		II.*	Tr.	Eg.		23	55		I.	Tr.	In.
	21	7		III.	Sh.	In.														

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

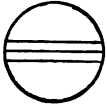
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

WASHINGTON MEAN TIME.

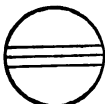
JUNE.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

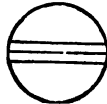
I.



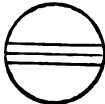
III.



II.



IV. No Eclipse.



*Configurations at 10<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1			'1	○		'3	4°	
2				○	I°	'2	3°	4°
3			'I	○	'3	4°		
4			'3	○	I°			
5		'3	4°	○				'2 ● 'I ●
6	4°		'3	○		2°		
7	4°		2°	○	'3	'I		
8	'4		'2 I°	○			'3	
9	'4			○	I°	'2	3°	
10		'4	'I	○	'3	4°		
11			'3	○	I°			
12		3°		○				'2 ● 'I ●
13		'3	I°	○		'4		
14			2°	○	'3	'I		'4
15		'2	I°	○		'3		'4
16				○	'3	4°		'4
17			'I	○	'3	4°		
18		2°	3°	○	I°		4°	
19		3°	'1	○		4°		
20	○ I°		'3	○	4°	'2		
21			4°	○	'I			'3 ●
22		4°	'2	○		'3		
23	4°			○	'3	4°		
24	4°		'I	○	'3	4°		
25	'4		2°	○	I°			
26	'4	3°	'1	○				
27		'4	'3	○	I°	'2		
28	○ 2°		'4	○				'I ●
29		'2	I°	○	'4	'3		
30				○	'2	'I	'4	3°

## WASHINGTON MEAN TIME.

JULY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s		
1	1	7		I.	11	1	27	52.3	II.	21	14	52		II.	21	14	52		Re.	
	2	8		I.		14	44		I.		15	7	59.6	II.		15	7	59.6	Dis.	
	3	19		I.		16	0		I.		17	23	17.4	II.		17	23	17.4	Re.	
	21	6		I.		16	57		I.		22	5	36	I.		22	5	36	In.	
	23	10		II.		18	12		I.		6	52		I.		6	52		In.	
2	0	27	43.0	I.	12	11	55		I.		7	49		I.		7	49		Eg.	
	1	31		II.		14	55		II.		9	5		I.*		9	5		Eg.	
	1	37		II.		15	19	43.3	I.		2	45		I.		10	2	45	Dis.	
	3	57		II.		17	17		II.		6	11	47.5	I.		11	6	11	Re.	
	4	8		III.		17	29		II.		6	45		II.		11	6	45	In.	
	6	5		III.		19	49		II.		9	8		II.*		12	9	8	Eg.	
	9	6		III.*		21	56		III.		9	22		II.*		12	9	22	In.	
	10	50		III.*		23	58		III.		11	42		II.		12	11	42	Eg.	
	18	23		I.	13	3	18	55.2	III.		15	43		III.		13	15	43	In.	
	19	36		I.		4	46	0.4	III.		17	48		III.		13	17	48	Eg.	
	20	36		I.		9	13		I.*		21	4		III.		13	21	4	In.	
	21	48		I.		10	29		I.*		22	46		III.		13	22	46	Eg.	
3	15	34		I.		11	26		I.*		24	0	5	I.		14	24	0	In.	
	18	4		II.		12	41		I.		1	21		I.		14	1	21	In.	
	18	56	24.2	I.	14	6	23		I.		2	18		I.		14	2	18	Eg.	
	20	26		II.		9	48	23.8	I.*		3	34		I.		14	3	34	Eg.	
	20	35	14.4	II.		9	53		II.*		21	14		I.		14	21	14	Dis.	
	22	50	32.4	II.		12	16		II.*		25	0	40	31.0	I.		14	25	0	Re.
4	12	52		I.		12	30	44.8	II.		1	47		II.		14	1	47	Dis.	
	14	5		I.		14	46	2.4	II.		4	11		II.		14	4	11	Re.	
	15	5		I.		3	42		I.		4	27	0.5	II.		14	4	27	Dis.	
	16	17		I.		4	58		I.		6	42	18.5	II.		14	6	42	Re.	
5	10	2		I.*		5	55		I.		18	34		I.		14	18	34	In.	
	12	24		II.		7	10		I.		19	50		I.		14	19	50	In.	
	13	25	2.6	I.		0	51		I.		20	47		I.		14	20	47	Eg.	
	14	45		II.		4	11		II.		22	3		I.		14	22	3	Eg.	
	14	54		II.		4	17	3.6	I.		26	15	43	I.		14	26	15	Dis.	
	17	14		II.		6	34		II.		19	9	11.0	I.		14	19	9	Re.	
	18	6		III.		6	47		II.		20	3		II.		14	20	3	In.	
	20	5		III.		9	7		II.*		22	27		II.		14	22	27	Eg.	
	23	19	25.0	III.		11	47		III.		22	40		II.		14	22	40	In.	
6	0	46	59.0	III.		13	50		III.		27	1	0	II.		14	27	1	Eg.	
	7	20		I.		17	4		III.		5	49		III.		14	5	49	Dis.	
	8	34		I.*		18	48		III.		7	55		III.		14	7	55	Re.	
	9	33		I.*		22	10		I.		11	17	58.0	III.		14	11	17	Dis.	
	10	46		I.*		23	26		I.		12	44	12.5	III.		14	12	44	Re.	
7	4	30		I.		0	23		I.		13	3		I.		14	13	3	In.	
	7	19		II.		1	38		I.		14	19		I.		14	14	19	In.	
	7	53	42.6	I.		19	20		I.		15	16		I.		14	15	16	Eg.	
	9	42		II.*		22	45	46.7	I.		16	31		I.		14	16	31	Eg.	
	9	53	25.3	II.*		23	11		II.		28	10	12	I.		14	28	10	Dis.	
	12	8	43.0	II.		1	34		II.		13	37	52.4	I.		14	13	37	Re.	
8	1	48		I.		1	49	50.4	II.		15	6		II.		14	15	6	Dis.	
	3	2		I.		4	5	8.0	II.		17	30		II.		14	17	30	Re.	
	4	1		I.		16	39		I.		17	45	7.8	II.		14	17	45	Dis.	
	5	14		I.		17	55		I.		20	0	26.2	II.		14	20	0	Re.	
	22	58		I.		18	52		I.		29	7	31	I.		14	29	7	In.	
9	1	39		II.		20	7		I.		8	47		I.*		14	8	47	In.	
	2	22	22.1	I.		19	13	48	I.		9	44		I.*		14	9	44	Eg.	
	4	1		II.		17	14	26.2	I.		11	0		I.		14	11	0	Eg.	
	4	12		II.		17	28		II.		4	40		I.		14	4	40	Dis.	
	6	32		II.		19	51		II.		8	6	32.7	I.*		14	8	6	Re.	
	7	55		III.		20	4		II.		9	21		II.*		14	9	21	In.	
	9	56		III.*		22	24		II.		11	45		II.		14	11	45	Eg.	
	13	5		III.		1	50		III.		11	57		II.		14	11	57	In.	
	14	49		III.		3	54		III.		14	17		II.		14	14	17	Eg.	
	20	16		I.		7	18	12.1	III.		19	43		III.		14	19	43	In.	
	21	31		I.		8	44	51.0	III.*		21	50		III.		14	21	50	Eg.	
	22	29		I.		11	7		I.		31	1	3	I.		14	31	1	In.	
	23	43		I.		12	24		I.		2	0		I.		14	2	0	In.	
10	17	26		I.		13	20		I.		2	45		III.		14	2	45	Eg.	
	20	36		II.		14	36		I.		3	16		I.		14	3	16	In.	
	20	51	2.2	I.		21	8	17	I.*		4	13		I.		14	4	13	Eg.	
	22	59		II.		11	43	7.4	I.		5	29		I.		14	5	29	Eg.	
	23	12	34.7	II.		12	28		II.		23	9		I.		14	23	9	Dis.	

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

JULY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

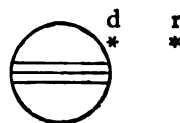
I.



III.



II.



IV. No Eclipse.

*Configurations at 9<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1		I'	○	2' 3'		'4
2		2' 3'	○	I'		'4
3	3'	'1	○			4'
4	'3		○	I' 2'		4'
5		'3	○	2'		4'
6	○ I'	2'	○	'3 4'		
7			○	'1	'3	'2 ●
8		4' I'	○	2' 3'		
9	○ 3'	4'	○	'1		
10	4'	3' '2 '1	○			
11	4'	'3	○	I' 2'		
12	'4	'3 '1	○	2'		
13	○ I'	'4 2'	○	'3		
14		'4	○	'1	'3	
15		'4 I'	○	2' 3'		
16		2'	○	3' '1		
17		3' '2 I'	○		'4	
18		'3	○	I' '3	'4	
19		'3 '1	○	2'		'4
20		2'	○	I' '3		4'
21		'2	○	'3	4'	'1 ●
22		I'	○	'2 3' 4'		
23	○ 2'		○	'1 4'		
24		'3 I' 4'	○			
25		3' 4'	○	'1		
26	4'	'3 '1	○	2'		
27	4'	2'	○	'3 I'		
28	4'	'2 '1	○	'3		
29	○ I'	'4	○	'2 3'		
30		'4	○	'1 3'		
31		'4 '2 3' I'	○			

## WASHINGTON MEAN TIME.

JULY.

d	h	m	s				d	h	m	s				d	h	m	s			
1	1	7		I.	Sh.	In.	11	1	27	52.3	II.	Ec.	Re.	21	14	52		II.	Oc.	Re.
	2	8		I.	Tr.	Eg.		14	44		I.	Tr.	In.		15	7	59.6	II.	Ec.	Dis.
	3	19		I.	Sh.	Eg.		16	0		I.	Sh.	In.		17	23	17.4	II.	Ec.	Re.
	21	6		I.	Oc.	Dis.		16	57		I.	Tr.	Eg.	22	5	36		I.	Tr.	In.
	23	10		II.	Tr.	In.		18	12		I.	Sh.	Eg.		6	52		I.	Sh.	In.
2	0	27	43.0	I.	Ec.	Re.	12	11	55		I.	Oc.	Dis.		7	49		I.	Tr.	Eg.
	1	31		II.	Tr.	Eg.		14	55		II.	Tr.	In.	23	9	5		I.*	Sh.	Eg.
	1	37		II.	Sh.	In.		15	19	43.3	I.	Ec.	Re.	23	2	45		I.	Oc.	Dis.
	3	57		II.	Sh.	Eg.		17	17		II.	Tr.	Eg.		6	11	47.5	I.	Ec.	Re.
	4	8		III.	Tr.	In.		17	29		II.	Sh.	In.		6	45		II.	Tr.	In.
	6	5		III.	Tr.	Eg.		19	49		II.	Sh.	Eg.		9	8		II.*	Tr.	Eg.
	9	6		III.*	Sh.	In.		21	56		III.	Oc.	Dis.		9	22		II.*	Sh.	In.
	10	50		III.*	Sh.	Eg.		23	58		III.	Oc.	Re.		11	42		II.	Sh.	Eg.
	18	23		I.	Tr.	In.	18	3	18	55.2	III.	Ec.	Dis.		15	43		III.	Tr.	In.
	19	36		I.	Sh.	In.		4	46	0.4	III.	Ec.	Re.		17	48		III.	Tr.	Eg.
	20	36		I.	Tr.	Eg.		9	13		I.*	Tr.	In.		21	4		III.	Sh.	In.
	21	48		I.	Sh.	Eg.		10	29		I.*	Sh.	In.		22	46		III.	Sh.	Eg.
3	15	34		I.	Oc.	Dis.		11	26		I.*	Tr.	Eg.	24	0	5		I.	Tr.	In.
	18	4		II.	Oc.	Dis.		12	41		I.	Sh.	Eg.		1	21		I.	Sh.	In.
	18	56	24.2	I.	Ec.	Re.	14	6	23		I.	Oc.	Dis.		2	18		I.	Tr.	Eg.
	20	26		II.	Oc.	Re.		9	48	23.8	I.*	Ec.	Re.		3	34		I.	Sh.	Eg.
	20	35	14.4	II.	Ec.	Dis.		9	53		II.*	Oc.	Dis.		21	14		I.	Oc.	Dis.
	22	50	32.4	II.	Ec.	Re.		12	16		II.	Oc.	Re.	25	0	40	31.0	I.	Ec.	Re.
4	12	52		I.	Tr.	In.		12	30	44.8	II.	Ec.	Dis.		1	47		II.	Oc.	Dis.
	14	5		I.	Sh.	In.		14	46	2.4	II.	Ec.	Re.		4	11		II.	Oc.	Re.
	15	5		I.	Tr.	Eg.	15	3	42		I.	Tr.	In.		4	27	0.5	II.	Ec.	Dis.
	16	17		I.	Sh.	Eg.		4	58		I.	Sh.	In.		6	42	18.5	II.	Ec.	Re.
5	10	2		I.*	Oc.	Dis.		5	55		I.	Tr.	Eg.		18	34		I.	Tr.	In.
	12	24		II.	Tr.	In.		7	10		I.	Sh.	Eg.		19	50		I.	Sh.	In.
	13	25	2.6	I.	Ec.	Re.	16	0	51		I.	Oc.	Dis.		20	47		I.	Tr.	Eg.
	14	45		II.	Tr.	Eg.		4	11		II.	Tr.	In.		22	3		I.	Sh.	Eg.
	14	54		II.	Sh.	In.		4	17	3.6	I.	Ec.	Re.	26	15	43		I.	Oc.	Dis.
	17	14		II.	Sh.	Eg.		6	34		II.	Tr.	Eg.		19	9	11.0	I.	Ec.	Re.
	18	6		III.	Oc.	Dis.		6	47		II.	Sh.	In.		20	3		II.	Tr.	In.
	20	5		III.	Oc.	Re.		9	7		II.*	Sh.	Eg.		22	27		II.	Tr.	Eg.
	23	19	25.0	III.	Ec.	Dis.		11	47		III.	Tr.	In.		22	40		II.	Sh.	In.
6	0	46	59.0	III.	Ec.	Re.		13	50		III.	Tr.	Eg.	27	1	0		II.	Sh.	Eg.
	7	20		I.	Tr.	In.		17	4		III.	Sh.	In.		5	49		III.	Oc.	Dis.
	8	34		I.*	Sh.	In.		18	48		III.	Sh.	Eg.		7	55		III.	Oc.	Re.
	9	33		I.*	Tr.	Eg.		22	10		I.	Tr.	In.		11	17	58.0	III.	Ec.	Dis.
	10	46		I.*	Sh.	Eg.		23	26		I.	Sh.	In.		12	44	12.5	III.	Ec.	Re.
7	4	30		I.	Oc.	Dis.	17	0	23		I.	Tr.	Eg.		13	3		I.	Tr.	In.
	7	19		II.	Oc.	Dis.		1	38		I.	Sh.	Eg.		14	19		I.	Sh.	In.
	7	53	42.6	I.	Ec.	Re.		19	20		I.	Oc.	Dis.		15	16		I.	Tr.	Eg.
	9	42		II.*	Oc.	Re.		22	45	46.7	I.	Ec.	Re.		16	31		I.	Sh.	Eg.
	9	53	25.3	II.*	Ec.	Dis.		23	11		II.	Oc.	Dis.	28	10	12		I.	Oc.	Dis.
	12	8	43.0	II.	Ec.	Re.	18	1	34		II.	Oc.	Re.		13	37	52.4	I.	Ec.	Re.
8	1	48		I.	Tr.	In.		1	49	50.4	II.	Ec.	Dis.		15	6		II.	Oc.	Dis.
	3	2		I.	Sh.	In.		4	5	8.0	II.	Ec.	Re.		17	30		II.	Oc.	Re.
	4	1		I.	Tr.	Eg.		16	39		I.	Tr.	In.		17	45	7.8	II.	Ec.	Dis.
	5	14		I.	Sh.	Eg.		17	55		I.	Sh.	In.		20	0	26.2	II.	Ec.	Re.
	22	58		I.	Oc.	Dis.		18	52		I.	Tr.	Eg.	29	7	31		I.	Tr.	In.
9	1	39		II.	Tr.	In.		20	7		I.	Sh.	Eg.		8	47		I.*	Sh.	In.
	2	22	22.1	I.	Ec.	Re.	19	13	48		I.	Oc.	Dis.		9	44		I.*	Tr.	Eg.
	4	1		II.	Tr.	Eg.		17	14	26.2	I.	Ec.	Re.		11	0		I.	Sh.	Eg.
	4	12		II.	Sh.	In.		17	28		II.	Tr.	In.	30	4	40		I.	Oc.	Dis.
	6	32		II.	Sh.	Eg.		19	51		II.	Tr.	Eg.		8	6	32.7	I.*	Ec.	Re.
	7	55		III.	Tr.	In.		20	4		II.	Sh.	In.		9	21		II.*	Tr.	In.
	9	56		III.*	Tr.	Eg.		22	24		II.	Sh.	Eg.		11	45		II.	Tr.	Eg.
	13	5		III.	Sh.	In.	20	1	50		III.	Oc.	Dis.		11	57		II.	Sh.	In.
	14	49		III.	Sh.	Eg.		3	54		III.	Oc.	Re.		14	17		II.	Sh.	Eg.
	20	16		I.	Tr.	In.		7	18	12.1	III.	Ec.	Dis.		19	43		III.	Tr.	In.
	21	31		I.	Sh.	In.		8	44	51.0	III.*	Ec.	Re.		21	50		III.	Tr.	Eg.
	22	29		I.	Tr.	Eg.		11	7		I.	Tr.	In.	31	1	3		III.	Sh.	In.
	23	43		I.	Sh.	Eg.		12	24		I.	Sh.	In.		2	0		I.	Tr.	In.
10	17	26		I.	Oc.	Dis.		13	20		I.	Tr.	Eg.		2	45		III.	Sh.	Eg.
	20	36		II.	Oc.	Dis.		14	36		I.	Sh.	Eg.		3	16		I.	Sh.	In.
	20	51	2.2	I.	Ec.	Re.	21	8	17		I.*	Oc.	Dis.		4	13		I.	Tr.	Eg.
	22	59		II.	Oc.	Re.		11	43	7.4	I.	Ec.	Re.		5	29		I.	Sh.	Eg.
	23	12	34.7	II.	Ec.	Dis.		12	28		II.	Oc.	Dis.		23	9		I.	Oc.	Dis.

NOTE.—In, denotes ingress; Eg, egress; Dis, disappearance; Re, reappearance; Ec, eclipse.

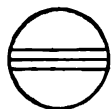
Oc, denotes occultation; Tr, transit of the satellite; Sh, transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

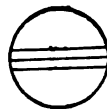
JULY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



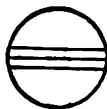
III.



II.



IV. No Eclipse.

*Configurations at 9<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1			1°	○	2° 3'	4°
2			2° 3'	○	1°	4°
3		3°	1°	○		4°
4		3°		○	1° 2°	4°
5			3° 1°	○	2°	4°
6	○ 1°		2°	○	3° 4°	
7				○	1°	3° 2°
8		4°	1°	○	2° 3°	
9	○ 3°	4°	2°	○	1°	
10	4°	3°	2° 1°	○		
11	4°	3°		○	1° 2°	
12	4°		3° 1°	○	2°	
13	○ 1°	4°	2°	○	3°	
14		4°		○	1°	3°
15			4° 1°	○	2° 3°	
16			2°	○	3° 4°	
17		3° 2° 1°		○		4°
18		3°		○	1°	4°
19			3° 1°	○	2°	4°
20			2°	○	1° 3°	4°
21			2°	○		3° 4° 1°
22			1°	○	2° 3° 4°	
23	○ 2°			○	1° 4°	
24			3° 1° 4°	○		
25		3° 4°		○	1°	
26		4°	3° 1°	○	2°	
27		4°	2°	○	3° 1°	
28		4°	2° 1°	○		3°
29	○ 1°	4°		○	2° 3°	
30		4°		○	1° 3°	
31			4° 2° 3° 1°	○		



## WASHINGTON MEAN TIME.

## AUGUST.

d	h	m	s				d	h	m	s				d	h	m	s				
1	2	35	17.0	I.	Ec.	Re.	10	19	16	4.7	III.	Ec.	Dis.	21	8	7		III.*	Tr.	In.	
	4	26		II.	Oc.	Dis.		20	21		I.	Sh.	Eg.		9	2		I.	Sh.	In.	
	6	50		II.	Oc.	Re.		20	41	38.7	III.	Ec.	Re.		10	5		I.	Tr.	Eg.	
	7	4	3.4	II.*	Ec.	Dis.	11	14	4		I.	Oc.	Dis.		10	16		III.	Tr.	Eg.	
	9	19	22.2	II.*	Ec.	Re.		17	27	26.8	I.	Ec.	Re.		11	14		I.	Sh.	Eg.	
	20	29		I.	Tr.	In.		20	26		II.	Oc.	Dis.		13	2		III.	Sh.	In.	
	21	45		I.	Sh.	In.		22	51		II.	Oc.	Re.		14	43		III.	Sh.	Eg.	
	22	42		I.	Tr.	Eg.		22	59	0.5	II.	Ec.	Dis.		22	5	0	I.	Oc.	Dis.	
	23	57		I.	Sh.	Eg.	12	1	14	21.3	II.	Ec.	Re.		8	19	39.4	I.*	Ec.	Re.	
2	17	38		I.	Oc.	Dis.		11	24		I.	Tr.	In.		12	31		II.	Oc.	Dis.	
	21	3	57.0	I.	Ec.	Re.		12	38		I.	Sh.	In.		17	9	41.6	II.	Ec.	Re.	
	22	39		II.	Tr.	In.		13	38		I.	Tr.	Eg.		23	2	21	I.	Tr.	In.	
3	1	3		II.	Tr.	Eg.		14	50		I.	Sh.	Eg.		3	31		I.	Sh.	In.	
	1	15		II.	Sh.	In.	13	8	33		I.*	Oc.	Dis.		4	35		I.	Tr.	Eg.	
	3	35		II.	Sh.	Eg.		11	56	6.7	I.	Ec.	Re.		5	43		I.	Sh.	Eg.	
	9	51		III.*	Oc.	Dis.		14	38		II.	Tr.	In.		23	30		I.	Oc.	Dis.	
	11	58		III.	Oc.	Re.		17	2		II.	Tr.	Eg.		24	2	48	19.6	I.	Ec.	Re.
	14	59		I.	Tr.	In.		17	8		II.	Sh.	In.		6	41		II.	Tr.	In.	
	15	17	5.2	III.	Ec.	Dis.		19	28		II.	Sh.	Eg.		9	1		II.	Sh.	In.	
	16	14		I.	Sh.	In.	14	3	56		III.	Tr.	In.		9	6		II.	Tr.	Eg.	
	16	42	58.0	III.	Ec.	Re.		5	54		I.	Tr.	In.		11	21		II.	Sh.	Eg.	
	17	12		I.	Tr.	Eg.		6	4		III.	Tr.	Eg.		20	51		I.	Tr.	In.	
	18	26		I.	Sh.	Eg.		7	7		I.	Sh.	In.		22	0		I.	Sh.	In.	
4	12	7		I.	Oc.	Dis.		8	7		I.*	Tr.	Eg.		22	18		III.	Oc.	Dis.	
	15	32	39.1	I.	Ec.	Re.		9	2		III.*	Sh.	In.		23	5		I.	Tr.	Eg.	
	17	45		II.	Oc.	Dis.		9	19		I.*	Sh.	Eg.		25	0	12	I.	Sh.	Eg.	
	20	9		II.	Oc.	Re.		10	44		III.	Sh.	Eg.		0	26		III.	Oc.	Re.	
	20	22	8.5	II.	Ec.	Dis.	15	3	3		I.	Oc.	Dis.		3	13	52.7	III.	Ec.	Dis.	
	22	37	27.7	II.	Ec.	Re.		6	24	51.6	I.	Ec.	Re.		4	38	54.7	III.	Ec.	Re.	
5	9	28		I.*	Tr.	In.		9	48		II.	Oc.	Dis.		17	59		I.	Oc.	Dis.	
	10	43		I.	Sh.	In.		12	12		II.	Oc.	Re.		21	17	2.4	I.	Ec.	Re.	
	11	41		I.	Tr.	Eg.		12	17	43.3	II.	Ec.	Dis.		26	1	52	II.	Oc.	Dis.	
	12	55		I.	Sh.	Eg.		14	33	5.0	II.	Ec.	Re.		6	27	38.8	II.	Ec.	Re.	
6	6	36		I.	Oc.	Dis.	16	0	23		I.	Tr.	In.		15	21		I.	Tr.	In.	
	10	1	19.4	I.	Ec.	Re.		1	36		I.	Sh.	In.		16	28		I.	Sh.	In.	
	11	58		II.	Tr.	In.		2	37		I.	Tr.	Eg.		17	34		I.	Tr.	Eg.	
	14	23		II.	Tr.	Eg.		3	48		I.	Sh.	Eg.		18	40		I.	Sh.	Eg.	
	14	32		II.	Sh.	In.		21	32		I.	Oc.	Dis.		12	29		I.	Oc.	Dis.	
	16	52		II.	Sh.	Eg.	17	0	53	32.0	I.	Ec.	Re.		15	45	42.0	I.	Ec.	Re.	
	23	48		III.	Tr.	In.		3	59		II.	Tr.	In.		20	3		II.	Tr.	In.	
7	1	55		III.	Tr.	Eg.		6	23		II.	Tr.	Eg.		22	19		II.	Sh.	In.	
	3	57		I.	Tr.	In.		6	25		II.	Sh.	In.		22	28		II.	Tr.	Eg.	
	5	3		III.	Sh.	In.		8	45		II.*	Sh.	Eg.		28	0	39	II.	Sh.	Eg.	
	5	12		I.	Sh.	In.		18	6		III.	Oc.	Dis.		9	50		I.	Tr.	In.	
	6	10		I.	Tr.	Eg.		18	53		I.	Tr.	In.		10	57		I.	Sh.	In.	
	6	44		III.	Sh.	Eg.		20	5		I.	Sh.	In.		12	4		I.	Tr.	Eg.	
	7	24		I.	Sh.	Eg.		20	14		III.	Oc.	Re.		12	21		III.	Tr.	In.	
8	1	5		I.	Oc.	Dis.		21	6		I.	Tr.	Eg.		13	9		I.	Sh.	Eg.	
	4	30	4.0	I.	Ec.	Re.		22	17		I.	Sh.	Eg.		14	30		III.	Tr.	Eg.	
	7	6		II.	Oc.	Dis.		23	14	56.0	III.	Ec.	Dis.		17	1		III.	Sh.	In.	
	9	30		II.*	Oc.	Re.	18	0	40	13.0	III.	Ec.	Re.		18	42		III.	Sh.	Eg.	
	9	40	58.0	II.*	Ec.	Dis.		16	1		I.	Oc.	Dis.		29	6	59	I.*	Oc.	Dis.	
	11	56	18.0	II.	Ec.	Re.		19	22	14.6	I.	Ec.	Re.		10	14	26.6	I.	Ec.	Re.	
	22	26		I.	Tr.	In.		23	9		II.	Oc.	Dis.		15	15		II.	Oc.	Dis.	
	23	40		I.	Sh.	In.	19	1	33		II.	Oc.	Re.		19	46	7.5	II.	Ec.	Re.	
9	0	39		I.	Tr.	Eg.		1	35	42.7	II.	Ec.	Dis.		4	20		I.	Tr.	In.	
	1	52		I.	Sh.	Eg.		3	51	5.3	II.	Ec.	Re.		5	26		I.	Sh.	In.	
	19	35		I.	Oc.	Dis.		13	22		I.	Tr.	In.		6	34		I.	Tr.	Eg.	
	22	58	44.3	I.	Ec.	Re.		14	33		I.	Sh.	In.		7	38		I.*	Sh.	Eg.	
10	1	18		II.	Tr.	In.		15	36		I.	Tr.	Eg.		8	1	29	I.	Oc.	Dis.	
	3	42		II.	Tr.	Eg.		16	45		I.	Sh.	Eg.		4	43	6.6	I.	Ec.	Re.	
	3	50		II.	Sh.	In.	20	10	31		I.	Oc.	Dis.		9	25		II.	Tr.	In.	
	6	10		II.	Sh.	Eg.		13	50	54.5	I.	Ec.	Re.		11	37		II.	Sh.	In.	
	13	57		III.	Oc.	Dis.		17	20		II.	Tr.	In.		11	50		II.	Tr.	Eg.	
	16	5		III.	Oc.	Re.		19	43		II.	Sh.	In.		13	57		II.	Sh.	Eg.	
	16	55		I.	Tr.	In.		19	45		II.	Tr.	Eg.		22	49		I.	Tr.	In.	
	18	9		I.	Sh.	In.		22	3		II.	Sh.	Eg.		23	54		I.	Sh.	In.	
	19	8		I.	Tr.	Eg.	21	7	52		I.*	Tr.	In.								

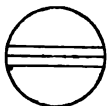

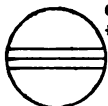
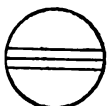
NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

AUGUST.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		II.	
III.		IV. No Eclipse.	

*Configurations at 8<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1		3'		'4	○	'2	'1	
2			'3	'1	○		'4	
3				2'	○	1'		'4
4			'2	'1	○		'3	'4
5					○	1'	'2	3'
6					○	2'	3'	4' '1 ●
7			2'	3' 1'	○			4'
8		3'			○	'1		4' '2 ●
9		'3		1'	○	4'	2'	
10				'2	○	1'		
11		4'		'2 '1	○		'3	
12		4'			○	1'	'2	'3
13	4'				○	2'	3'	'1 ●
14	'4		2'	8' 1'	○			
15	'4		3'		○	'1		
16		'4	'3	1'	○		2'	
17			'4	'3 2'	○	'1		
18			'2	'1	○		'3	
19					○	1' '2	'4	'3
20				'1	○	2'	3'	'4
21	○ 1' ○ 3'		2'		○			'4
22		3'		'2	○	'1		'4
23		'3		1'	○		'2	4'
24	○ 2'		'3		○	'1		4'
25			'2 '1		○	'3	4'	
26					○	'2 1'	'3	
27			4'	'1	○	2'	3'	
28		4'		2'	○	1' '2		
29		4'		3' '2	○			'1
30	4'		'3	1'	○		2'	
31	'4		'3		○	2'	'1	

## WASHINGTON MEAN TIME.

## SEPTEMBER.

d	h	m	s				d	h	m	s				d	h	m	s			
1	1	3		I.	Tr.	Eg.	11	3	58		II.	Tr.	Eg.	21	7	27		I.*	Oc.	Dis.
	2	6		I.	Sh.	Eg.		5	51		II.	Sh.	Eg.		10	27	22.1	I.	Ec.	Re.
	2	34		III.	Oc.	Dis.		13	49		I.	Tr.	In.		17	44		II.	Tr.	In.
	4	42		III.	Oc.	Re.		14	46		I.	Sh.	In.		19	24		II.	Sh.	In.
	7	13	20.8	III.*	Ec.	Dis.		16	3		I.	Tr.	Eg.		20	9		II.	Tr.	Eg.
	8	38	10.0	III.	Ec.	Re.		16	58		I.	Sh.	Eg.		21	44		II.	Sh.	Eg.
	19	58		I.	Oc.	Dis.		20	56		III.	Tr.	In.	22	4	49		I.	Tr.	In.
	23	11	49.4	I.	Ec.	Re.		23	4		III.	Tr.	Eg.		5	38		I.	Sh.	In.
2	4	37		II.	Oc.	Dis.	12	0	58		III.	Sh.	In.		7	3		I.*	Tr.	Eg.
	9	4	1.1	II.	Ec.	Re.		2	40		III.	Sh.	Eg.		7	50		I.	Sh.	Eg.
	17	19		I.	Tr.	In.		10	57		I.	Oc.	Dis.		15	34		III.	Oc.	Dis.
	18	23		I.	Sh.	In.		14	3	59.1	I.	Ec.	Re.		17	41		III.	Oc.	Re.
	19	33		I.	Tr.	Eg.		20	46		II.	Oc.	Dis.		19	10	54.1	III.	Ec.	Dis.
	20	35		I.	Sh.	Eg.	13	0	58	23.5	II.	Ec.	Re.		20	35	22.1	III.	Ec.	Re.
3	14	28		I.	Oc.	Dis.		8	19		I.	Tr.	In.	23	1	58		I.	Oc.	Dis.
	17	40	28.5	I.	Ec.	Re.		9	15		I.	Sh.	In.		4	56	4.4	I.	Ec.	Re.
	22	47		II.	Tr.	In.		10	33		I.	Tr.	Eg.		12	56		II.	Oc.	Dis.
4	0	55		II.	Sh.	In.		11	27		I.	Sh.	Eg.		16	51	54.1	II.	Ec.	Re.
	1	12		II.	Tr.	Eg.	14	5	27		I.	Oc.	Dis.		23	19		I.	Tr.	In.
	3	15		II.	Sh.	Eg.		8	32	38.2	I.	Ec.	Re.	24	0	7		I.	Sh.	In.
	11	49		I.	Tr.	In.		14	56		II.	Tr.	In.		1	33		I.	Tr.	Eg.
	12	52		I.	Sh.	In.		16	49		II.	Sh.	In.		2	19		I.	Sh.	Eg.
	14	3		I.	Tr.	Eg.		17	21		II.	Tr.	Eg.		20	28		I.	Oc.	Dis.
	15	4		I.	Sh.	Eg.		19	9		II.	Sh.	Eg.		23	24	42.0	I.	Ec.	Re.
	16	38		III.	Tr.	In.	15	2	49		I.	Tr.	In.	25	7	8		II.	Tr.	In.
	18	46		III.	Tr.	Eg.		3	44		I.	Sh.	In.		8	42		II.	Sh.	In.
	21	0		III.	Sh.	In.		5	2		I.	Tr.	Eg.		9	33		II.	Tr.	Eg.
	22	41		III.	Sh.	Eg.		5	56		I.	Sh.	Eg.		11	2		II.	Sh.	Eg.
5	8	58		I.	Oc.	Dis.		11	12		III.	Oc.	Dis.		17	50		I.	Tr.	In.
	12	9	13.3	I.	Ec.	Re.		13	19		III.	Oc.	Re.		18	36		I.	Sh.	In.
	18	0		II.	Oc.	Dis.		15	12	2.8	III.	Ec.	Dis.		20	3		I.	Tr.	Eg.
	22	22	21.6	II.	Ec.	Re.		16	36	35.2	III.	Ec.	Re.		20	48		I.	Sh.	Eg.
6	6	19		I.	Tr.	In.		23	57		I.	Oc.	Dis.	26	5	40		III.	Tr.	In.
	7	20		I.*	Sh.	In.	16	3	1	20.7	I.	Ec.	Re.		7	46		III.	Tr.	Eg.
	8	33		I.	Tr.	Eg.		10	9		II.	Oc.	Dis.		8	56		III.	Sh.	In.
	9	32		I.	Sh.	Eg.		14	16	9.0	II.	Ec.	Re.		10	37		III.	Sh.	Eg.
7	3	28		I.	Oc.	Dis.		21	19		I.	Tr.	In.		14	58		I.	Oc.	Dis.
	6	37	52.8	I.	Ec.	Re.		22	12		I.	Sh.	In.		17	53	25.8	I.	Ec.	Re.
	12	10		II.	Tr.	In.		23	33		I.	Tr.	Eg.	27	2	20		II.	Oc.	Dis.
	14	13		II.	Sh.	In.	17	0	24		I.	Sh.	Eg.		6	9	50.0	II.	Ec.	Re.
	14	35		II.	Tr.	Eg.		18	27		I.	Oc.	Dis.		12	20		I.	Tr.	In.
	16	33		II.	Sh.	Eg.		21	29	59.1	I.	Ec.	Re.		13	4		I.	Sh.	In.
8	0	49		I.	Tr.	In.	18	4	20		II.	Tr.	In.		14	33		I.	Tr.	Eg.
	1	49		I.	Sh.	In.		6	6		II.	Sh.	In.		15	16		I.	Sh.	Eg.
	3	3		I.	Tr.	Eg.		6	45		II.	Tr.	Eg.	28	9	28		I.	Oc.	Dis.
	4	1		I.	Sh.	Eg.		8	26		II.	Sh.	Eg.		12	22	4.0	I.	Ec.	Re.
	6	52		III.*	Oc.	Dis.		15	49		I.	Tr.	In.		20	32		II.	Tr.	In.
	8	59		III.	Oc.	Re.		16	41		I.	Sh.	In.		22	0		II.	Sh.	In.
	11	12	29.5	III.	Ec.	Dis.		18	3		I.	Tr.	Eg.		22	57		II.	Tr.	Eg.
	12	37	9.1	III.	Ec.	Re.		18	53		I.	Sh.	Eg.	29	0	20		II.	Sh.	Eg.
	21	58		I.	Oc.	Dis.	19	1	17		III.	Tr.	In.		6	50		I.*	Tr.	In.
9	1	6	35.3	I.	Ec.	Re.		3	24		III.	Tr.	Eg.		7	33		I.	Sh.	In.
	7	23		II.*	Oc.	Dis.		4	57		III.	Sh.	In.		9	3		I.	Tr.	Eg.
	11	40	11.2	II.	Ec.	Re.		6	38		III.	Sh.	Eg.		9	45		I.	Sh.	Eg.
	19	19		I.	Tr.	In.		12	57		I.	Oc.	Dis.		19	58		III.	Oc.	Dis.
	20	18		I.	Sh.	In.		15	58	43.5	I.	Ec.	Re.		22	3		III.	Oc.	Re.
	21	33		I.	Tr.	Eg.		23	33		II.	Oc.	Dis.	30	23	9	35.1	III.	Ec.	Dis.
	22	30		I.	Sh.	Eg.	20	3	34	13.0	II.	Ec.	Re.		0	34	1.0	III.	Ec.	Re.
10	16	27		I.	Oc.	Dis.		10	19		I.	Tr.	In.		3	58		I.	Oc.	Dis.
	19	35	14.4	I.	Ec.	Re.		11	10		I.	Sh.	In.		6	50	45.8	I.	Ec.	Re.
11	1	33		II.	Tr.	In.		12	33		I.	Tr.	Eg.		15	44		II.	Oc.	Dis.
	3	31		II.	Sh.	In.		13	22		I.	Sh.	Eg.		19	27	26.3	II.	Ec.	Re.

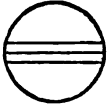
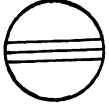
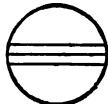

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

## SEPTEMBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		III.	
II.		IV. No Eclipse.	

*Configurations at 7<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1	'4		2°	I°	○	'3		
2		'4			○	'I	'3	'2●
3			'4	'I	○		2°	3°
4				2°	○	'4	1°	2°
5				'3	'I	○		'4
6	○ I°		3°		○		'2	'4
7			'3		○	'I	2°	'4
8			2°	I°	○			'4 '3●
9					○	'I	'3	4°
10				'I	○		2°	3° 4°
11				2°	○	I°	3°	4°
12			'2	3° 'I	○	4°		
13			3°	4°	○	I°	'2	
14			4° '3		○	2°		'I●
15		4°		2°	'3	○		
16	4°			'2	○	'I	'3	
17	'4			I°	○		'2	'3
18	○ 2°	'4			○	I°	3°	
19		'4		'2	'I	3°	○	
20		3°	'4		○	1°	'3	
21		'3		'I	○	'4	2°	
22			2° '3	I°	○		'4	
23			'2		○	'I	'3	'4
24			I°		○		'2	'3 '4
25					○	'I	3°	4°
26	○ 3°		'2	'I	○			4°
27			3°		○	'2	I°	4°
28		'3		'I	○		2°	4°
29	○ I°		'3	'2	○	4°		
30			4° '2		○	'I	'3	

## WASHINGTON MEAN TIME.

## OCTOBER.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	1	20		I.	Tr.	In.		6	0 36	II.	Sh.	In.		10	14 31		III.	Tr.	In.
	2	2		I.	Sh.	In.			1 45	II.	Tr.	Eg.			16 33		III.	Tr.	Eg.
	3	33		I.	Tr.	Eg.			2 57	II.	Sh.	Eg.			16 54		III.	Sh.	In.
	4	14		I.	Sh.	Eg.			8 51	I.	Tr.	In.			18 35		III.	Sh.	Eg.
	22	28		I.	Oc.	Dis.			9 28	I.	Sh.	In.			19 0		I.	Oc.	Dis.
2	1	19	22.7	I.	Ec.	Re.			11 4	I.	Tr.	Eg.			21 42 43.3		I.	Ec.	Re.
	9	56		II.	Tr.	In.			11 40	I.	Sh.	Eg.			11 7 56		II.	Oc.	Dis.
	11	18		II.	Sh.	In.		7	0 23	III.	Oc.	Dis.			11 20 24.7		II.	Ec.	Re.
	12	21		II.	Tr.	Eg.			2 27	III.	Oc.	Re.			16 21		I.	Tr.	In.
	13	39		II.	Sh.	Eg.			3 8 6.0	III.	Ec.	Dis.			16 53		I.	Sh.	In.
	19	50		I.	Tr.	In.			4 32 31.2	III.	Ec.	Re.			18 34		I.	Tr.	Eg.
	20	30		I.	Sh.	In.			5 59	I.*	Oc.	Dis.			19 5		I.	Sh.	Eg.
	22	3		I.	Tr.	Eg.			8 45 25.0	I.	Ec.	Re.		12	13 30		I.	Oc.	Dis.
	22	42		I.	Sh.	Eg.			18 32	II.	Oc.	Dis.			16 11 20.3		I.	Ec.	Re.
3	10	4		III.	Tr.	In.			22 2 45.4	II.	Ec.	Re.		13	2 10		II.	Tr.	In.
	12	9		III.	Tr.	Eg.		8	3 21	I.	Tr.	In.			3 12		II.	Sh.	In.
	12	55		III.	Sh.	In.			2 56	I.	Sh.	In.			4 35		II.	Tr.	Eg.
	14	36		III.	Sh.	Eg.			5 34	I.	Tr.	Eg.			5 33		II.	Sh.	Eg.
	16	59		I.	Oc.	Dis.			6 8	I.*	Sh.	Eg.			10 51		I.	Tr.	In.
	19	48	6.0	I.	Ec.	Re.		9	0 30	I.	Oc.	Dis.			11 22		I.	Sh.	In.
4	5	8		II.	Oc.	Dis.			3 14 0.8	I.	Ec.	Re.			13 4		I.	Tr.	Eg.
	8	45	13.7	II.	Ec.	Re.			12 45	II.	Tr.	In.			13 34		I.	Sh.	Eg.
	14	20		I.	Tr.	In.			13 54	II.	Sh.	In.		14	4 49		III.	Oc.	Dis.
	14	59		I.	Sh.	In.			15 10	II.	Tr.	Eg.			6 52		III.	Oc.	Re.
	16	34		I.	Tr.	Eg.			16 15	II.	Sh.	Eg.			7 6 40.4		III.	Ec.	Dis.
	17	11		I.	Sh.	Eg.			21 51	I.	Tr.	In.			8 1		I.	Oc.	Dis.
5	11	29		I.	Oc.	Dis.			22 25	I.	Sh.	In.			8 31 8.0		III.	Ec.	Re.
	14	16	43.5	I.	Ec.	Re.		10	0 4	I.	Tr.	Eg.			10 40 1.1		I.	Ec.	Re.
	23	20		II.	Tr.	In.			0 37	I.	Sh.	Eg.			21 20		II.	Oc.	Dis.

## THE SATELLITES OF JUPITER

ARE NOT VISIBLE FROM OCTOBER 13 UNTIL DECEMBER 12.

JUPITER BEING TOO NEAR TO THE SUN.

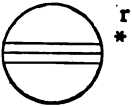
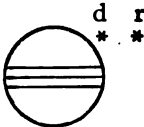


NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

OCTOBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		III.	
II.		IV. No Eclipse.	

*Configurations at 6<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1	4°		1°	○	2°	3°
2	4°			○	1°	3°
3	4°	2°	1°	○	3°	
4	4°	3°		○	1°	2° ●
5	4°	3°	1°	○	2°	
6		4°	3°	○	1°	
7			4°	○	3°	1° ●
8			1°	○	4°	2° 3°
9				○	1°	4°
10		2°	1°	○	3°	4°
11		3°	2°	○	1°	4°
12		3°	1°	○	2°	4°
13		3°	2°	○	1°	4°
14		2°	1°	○	4°	3° ●

## WASHINGTON MEAN TIME.

DECEMBER.

d h m s				d h m s				d h m s												
11	18	15	16.8	I.*	Ec.	Dis.	18	0	57	II.	Oc.	Re.	25	1	26	III.	Oc.	Dis.		
20	55			I.	Oc.	Re.	1	7		I.	Sh.	Eg.	1	29		I.	Tr.	In.		
12	13	21		II.	Sh.	In.	1	42		I.	Tr.	Eg.	3	0		I.	Sh.	Eg.		
14	19			II.	Tr.	In.	20	9	16.1	I.	Ec.	Dis.	3	18		III.	Oc.	Re.		
15	30			I.	Sh.	In.	22	55		I.	Oc.	Re.	3	42		I.	Tr.	Eg.		
15	43			II.	Sh.	Eg.	19	15	57	II.	Sh.	In.	3	44		II.	Oc.	Re.		
15	59			I.	Tr.	In.	17	8		II.	Tr.	In.	22	3	11.0	I.	Ec.	Dis.		
16	44			II.	Tr.	Eg.	17	23		I.*	Sh.	In.	26	0	56	I.	Oc.	Re.		
17	42			I.	Sh.	Eg.	17	59		I.*	Tr.	In.	18	33		II.*	Sh.	In.		
18	12			I.*	Tr.	Eg.	18	19		II.*	Sh.	Eg.	19	16		I.	Sh.	In.		
18	12	43	50.5	I.	Ec.	Dis.	19	33		II.	Tr.	Eg.	19	57		II.	Tr.	In.		
15	25			I.	Oc.	Re.	19	35		I.	Sh.	Eg.	19	59		I.	Tr.	In.		
14	4	37		III.	Sh.	In.	20	12		I.	Tr.	Eg.	20	55		II.	Sh.	Eg.		
6	20			III.	Sh.	Eg.	20	14	37	49.0	I.	Ec.	Dis.	21	28		I.	Sh.	Eg.	
6	39			III.	Tr.	In.	17	26		I.*	Oc.	Re.	22	12		I.	Tr.	Eg.		
8	11	7.0		II.	Ec.	Dis.	21	8	34	III.	Sh.	In.	22	21		II.	Tr.	Eg.		
8	33			III.	Tr.	Eg.	10	17		III.	Sh.	Eg.	27	16	31	42.5	I.	Ec.	Dis.	
9	58			I.	Sh.	In.	10	44	19.1	II.	Ec.	Dis.	19	26		I.	Oc.	Re.		
10	29			I.	Tr.	In.	11	4		III.	Tr.	In.	28	12	32	III.	Sh.	In.		
11	34			II.	Oc.	Re.	11	51		I.	Sh.	In.	13	17	24.8	II.	Ec.	Dis.		
12	10			I.	Sh.	Eg.	12	29		I.	Tr.	In.	13	44		I.	Sh.	In.		
12	42			I.	Tr.	Eg.	12	57		III.	Tr.	Eg.	14	15		III.	Sh.	Eg.		
15	7	12	18.4	I.	Ec.	Dis.	14	3		I.	Sh.	Eg.	14	29		I.	Tr.	In.		
9	55			I.	Oc.	Re.	14	20		II.	Oc.	Re.	15	27		III.	Tr.	In.		
16	2	39		II.	Sh.	In.	14	42		I.	Tr.	Eg.	15	57		I.	Sh.	Eg.		
3	43			II.	Tr.	In.	22	9	6	15.3	I.	Ec.	Dis.	16	41		I.	Tr.	Eg.	
4	26			I.	Sh.	In.	11	56		I.	Oc.	Re.	17	7		II.	Oc.	Re.		
4	59			I.	Tr.	In.	23	5	15	II.	Sh.	In.	17	18		III.	Tr.	Eg.		
5	1			II.	Sh.	Eg.	6	20		I.	Sh.	In.	29	11	0	7.8	I.	Ec.	Dis.	
6	8			II.	Tr.	Eg.	6	32		II.	Tr.	In.	13	56		I.	Oc.	Re.		
6	38			I.	Sh.	Eg.	6	59		I.	Tr.	In.	30	7	51	II.	Sh.	In.		
7	12			I.	Tr.	Eg.	7	37		II.	Sh.	Eg.	8	13		I.	Sh.	In.		
17	1	40	51.3	I.	Ec.	Dis.	8	32		I.	Sh.	Eg.	8	59		I.	Tr.	In.		
4	25			I.	Oc.	Re.	8	56		II.	Tr.	Eg.	9	21		II.	Tr.	In.		
18	52	29.6		III.	Ec.	Dis.	9	12		I.	Tr.	Eg.	10	13		II.	Sh.	Eg.		
20	19	20.6		III.	Ec.	Re.	24	3	34	47.1	I.	Ec.	Dis.	10	25		I.	Sh.	Eg.	
21	1			III.	Oc.	Dis.	6	26		I.	Oc.	Re.	11	11		I.	Tr.	Eg.		
21	27	44.8		II.	Ec.	Dis.	22	50	54.5	III.	Ec.	Dis.	11	46		II.	Tr.	Eg.		
22	54			III.	Oc.	Re.	25	0	0	53.1	II.	Ec.	Dis.	31	5	28	38.8	I.	Ec.	Dis.
22	54			I.	Sh.	In.	0	18	14.3	III.	Ec.	Re.	8	26		I.	Oc.	Re.		
23	29			I.	Tr.	In.	0	48		I.	Sh.	In.								

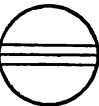
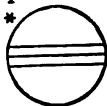
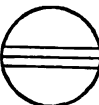

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

WASHINGTON MEAN TIME.

DECEMBER.

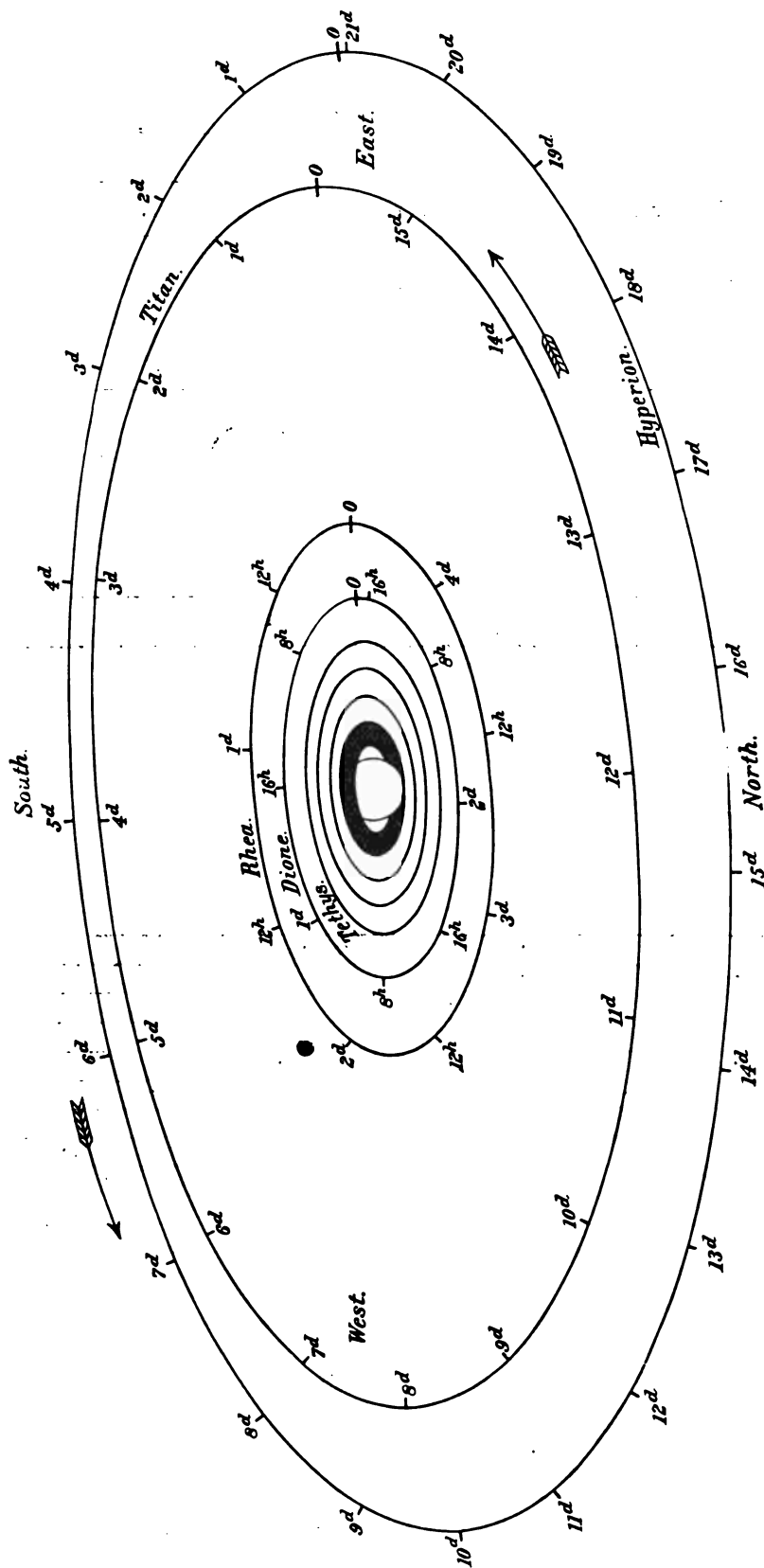
*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.	d * 	III.	d r * * 
II.	d * 	IV. No Eclipse.	

*Configurations at 18<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
11		'4		'1	○		'2	'3
12	○ 1°		'4		2°	○		3°
13				'2	'4	○	'1	3°
14					1°	○	'4	'2
15		3°				○	'1	'4
16			'3	2°	'1	○		'4
17				'2	'3	○	1°	'4
18				'1	○		'2	'3
19	○ 1°	○ 2°				○	3°	4°
20			'2			○	'1	3°
21				1°	3°	○	'2	4°
22		3°				○	'1	2°
23		'3	4°	'1		○		
24		4°		'2	'3	○	1°	
25	4°			'1	○		'2	'3
26	4°				1°	○		'3
27	'4		2°			○	3°	1°
28	○ 3°	'4			1°	○	'2	
29			'4	3°		○	'1	2°
30		'3		1°	4°	○		
31				'2	'3	○	'4	1°





APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,

AT OPPOSITION IN 1899,

AS SEEN IN AN INVERTING TELESCOPE.

NAMES OF THE SATELLITES.

- I. Mimas.
- II. Enceladus.
- III. Tethys.
- IV. Dione.
- V. Rhea.
- VI. Titan.
- VII. Hyperion.
- VIII. Iapetus.

MEAN SYNODIC PERIODS		
	d	h
I	0	22.6
II	1	8.9
III	1	21.3
IV	2	17.7
V	4	12.5
VI	15	23.3
VII	21	7.6
VIII	79	22.1

## WASHINGTON MEAN TIME OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "o" are those of the eastern elongation, as seen in an inverting telescope. The apparent positions of a satellite at any time may be marked on the diagram by counting around the orbit the interval in days and hours which has elapsed since the last east elongation. The times of these elongations may be found from the following tables. Mimas can be seen only within a few hours of each elongation: the time of every elongation visible at Washington is therefore given. The times of other elongations of any satellite in the same direction may be found by adding or subtracting any multiple of the period. For the three outer satellites the times of elongation and conjunction are given. The following abbreviations are used:—

E., East Elongation,  
I., Inferior Conjunction (south of planet),  
W., West Elongation,  
S., Superior Conjunction (north of planet).

## MIMAS.

*Greatest Elongations Visible at Washington.*

Mar. 10 18.1 E. 11 16.8 E. 12 15.4 E. 13 14.0 E. 19 17.0 W.  20 15.6 W. 21 14.2 W. 27 17.2 E. 28 15.9 E. 29 14.5 E.  30 13.1 E. Apr. 5 16.1 W. 6 14.7 W. 7 13.3 W. 8 12.0 W.  13 16.3 E. 14 15.0 E. 15 13.6 E. 16 12.2 E.	Apr. 21 16.6 W. 22 15.2 W. 23 13.8 W. 24 12.4 W. 25 11.0 W.  29 16.8 E. 30 15.4 E. May 1 14.0 E. 2 12.6 E. 3 11.2 E.  4 9.8 E. 8 15.6 W. 9 14.2 W. 10 12.9 W. 11 11.5 W.  12 10.1 W. 16 15.8 E. 17 14.5 E. 18 13.1 E.	May 19 11.7 E. 20 10.3 E. 21 8.9 E. 24 16.0 W. 25 14.7 W.  26 13.3 W. 27 11.9 W. 28 10.5 W. 29 9.1 W. June 1 16.2 E.  2 14.9 E. 3 13.5 E. 4 12.1 E. 5 10.7 E. 6 9.3 E.  7 8.0 E. 10 15.1 W. 11 13.7 W. 12 12.3 W.	June 13 10.9 W. 14 9.6 W. 15 8.2 W. 18 15.3 E. 19 13.9 E.  20 12.5 E. 21 11.2 E. 22 9.8 E. 23 8.4 E. 26 15.5 W.  27 14.2 W. 28 12.8 W. 29 11.4 W. 30 10.0 W. July 1 8.6 W.  5 14.4 E. 6 13.0 E. 7 11.6 E. 8 10.2 E.	July 9 8.8 E. 14 13.2 W. 15 11.8 W. 16 10.5 W. 17 9.1 W.  18 7.7 W. 22 13.5 E. 23 12.1 E. 24 10.7 E. 25 9.3 E.  26 7.9 E. 31 12.3 W. Aug. 1 11.0 W. 2 9.6 W. 3 8.2 W.  9 11.2 E. 10 9.8 E. 11 8.4 E. 12 7.1 E.	Aug. 17 11.5 W. 18 10.1 W. 19 8.7 W. 20 7.3 W. 26 10.4 E.  27 9.0 E. 28 7.6 E. Sept. 3 10.7 W. 4 9.3 W. 5 7.9 W.  12 9.6 E. 13 8.2 E. 14 6.8 E. 21 8.5 W. 22 7.1 W.  29 8.8 E. 30 7.4 E. Oct. 8 7.7 W. 9 6.4 W.
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## ENCELADUS.

Mar. 10 12.1 E. 11 21.0 E. 13 5.9 E. 14 14.8 E. 15 23.7 E.  17 8.6 E. 18 17.4 E. 20 2.3 E. 21 11.2 E. 22 20.1 E.	Mar. 24 5.0 E. 25 13.9 E. 26 22.8 E. 28 7.6 E. 29 16.5 E.  31 1.4 E. Apr. 1 10.3 E. 2 19.2 E. 4 4.0 E. 5 12.9 E.	Apr. 6 21.8 E. 8 6.7 E. 9 15.6 E. 11 0.5 E. 12 9.4 E.  13 18.2 E. 15 3.1 E. 16 12.0 E. 17 20.9 E. 19 5.8 E.	Apr. 20 14.6 E. 21 23.5 E. 23 8.4 E. 24 17.2 E. 26 2.1 E.  27 11.0 E. 28 19.9 E. 30 4.8 E. May 1 13.6 E. 2 22.5 E.	May 4 7.4 E. 5 16.3 E. 7 1.2 E. 8 10.0 E. 9 18.9 E.  11 3.8 E. 12 12.7 E. 13 21.5 E. 15 6.4 E. 16 15.3 E.	May 18 0.2 E. 19 9.0 E. 20 17.9 E. 22 2.8 E. 23 11.7 E.  24 20.5 E. 26 5.4 E. 27 14.3 E. 28 23.2 E. 30 8.0 E.
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## WASHINGTON MEAN TIME OF GREATEST ELONGATION.

## ENCELADUS—(Concluded.)

May 31 16.9 E.	June 21 6.0 E.	July 11 19.2 E.	Aug. 1 8.4 E.	Aug. 21 21.7 E.	Sept. 11 11.1 E.
June 2 1.8 E.	22 14.9 E.	13 4.1 E.	2 17.3 E.	23 6.6 E.	12 20.0 E.
3 10.7 E.	23 23.8 E.	14 13.0 E.	4 2.2 E.	24 15.5 E.	14 4.9 E.
4 19.5 E.	25 8.7 E.	15 21.9 E.	5 11.1 E.	26 0.4 E.	15 13.8 E.
6 4.4 E.	26 17.6 E.	17 6.7 E.	6 20.0 E.	27 9.3 E.	16 22.7 E.
7 13.3 E.	28 2.4 E.	18 15.6 E.	8 4.8 E.	28 18.2 E.	18 7.6 E.
8 22.2 E.	29 11.3 E.	20 0.5 E.	9 13.7 E.	30 3.1 E.	19 16.5 E.
10 7.0 E.	30 20.2 E.	21 9.4 E.	10 22.6 E.	31 12.0 E.	21 1.4 E.
11 15.9 E.	July 2 5.1 E.	22 18.3 E.	12 7.5 E.	Sept. 1 20.8 E.	22 10.3 E.
13 0.8 E.	3 13.9 E.	24 3.2 E.	13 16.4 E.	3 5.7 E.	23 19.2 E.
14 9.7 E.	4 22.8 E.	25 12.0 E.	15 1.3 E.	4 14.6 E.	25 4.0 E.
15 18.5 E.	6 7.7 E.	26 20.9 E.	16 10.2 E.	5 23.5 E.	26 13.0 E.
17 3.4 E.	7 16.6 E.	28 5.8 E.	17 19.1 E.	7 8.4 E.	27 21.8 E.
18 12.3 E.	9 1.4 E.	29 14.7 E.	19 4.0 E.	8 17.3 E.	29 6.7 E.
19 21.2 E.	10 10.3 E.	30 23.5 E.	20 12.8 E.	10 2.2 E.	30 15.6 E.

## TETHYS.

Mar. 11 7.4 E.	Apr. 14 6.9 E.	May 18 6.2 E.	June 21 5.3 E.	July 25 4.6 E.	Aug. 28 4.2 E.
13 4.7 E.	16 4.2 E.	20 3.4 E.	23 2.6 E.	27 1.9 E.	30 1.5 E.
15 2.0 E.	18 1.5 E.	22 0.7 E.	24 23.9 E.	28 23.2 E.	31 22.8 E.
16 23.3 E.	19 22.8 E.	23 22.0 E.	26 21.2 E.	30 20.5 E.	Sept. 2 20.1 E.
18 20.6 E.	21 20.1 E.	25 19.3 E.	28 18.5 E.	Aug. 1 17.8 E.	4 17.4 E.
20 17.9 E.	23 17.4 E.	27 16.6 E.	30 15.8 E.	3 15.1 E.	6 14.8 E.
22 15.2 E.	25 14.6 E.	29 13.9 E.	July 2 13.1 E.	5 12.4 E.	8 12.1 E.
24 12.6 E.	27 11.9 E.	31 11.2 E.	4 10.4 E.	7 9.8 E.	10 9.4 E.
26 9.8 E.	29 9.2 E.	June 2 8.4 E.	6 7.7 E.	9 7.1 E.	12 6.7 E.
28 7.2 E.	May 1 6.5 E.	4 5.7 E.	8 5.0 E.	11 4.4 E.	14 4.0 E.
30 4.4 E.	3 3.8 E.	6 3.0 E.	10 2.3 E.	13 1.7 E.	16 1.4 E.
Apr. 1 1.7 E.	5 1.1 E.	8 0.3 E.	11 23.6 E.	14 23.0 E.	17 22.7 E.
2 23.0 E.	6 22.4 E.	9 21.6 E.	13 20.8 E.	16 20.3 E.	19 20.0 E.
4 20.4 E.	8 19.7 E.	11 18.9 E.	15 18.2 E.	18 17.6 E.	21 17.3 E.
6 17.7 E.	10 17.0 E.	13 16.2 E.	17 15.4 E.	20 14.9 E.	23 14.6 E.
8 15.0 E.	12 14.3 E.	15 13.5 E.	19 12.8 E.	22 12.2 E.	25 12.0 E.
10 12.3 E.	14 11.6 E.	17 10.8 E.	21 10.0 E.	24 9.5 E.	27 9.3 E.
12 9.6 E.	16 8.9 E.	19 8.0 E.	23 7.4 E.	26 6.8 E.	29 6.6 E.

## DIONE.

Mar. 19 16.7 E.	Apr. 21 12.8 E.	May 24 8.7 E.	June 26 4.5 E.	July 29 0.4 E.	Aug. 30 20.6 E.
22 10.4 E.	24 6.5 E.	27 2.3 E.	28 22.1 E.	31 18.1 E.	Sept. 2 14.4 E.
25 4.1 E.	27 0.2 E.	29 20.0 E.	July 1 15.8 E.	Aug. 3 11.7 E.	5 8.1 E.
27 21.8 E.	29 17.8 E.	June 1 13.6 E.	4 9.4 E.	6 5.4 E.	8 1.8 E.
30 15.4 E.	May 2 11.5 E.	4 7.3 E.	7 3.1 E.	8 23.1 E.	10 19.5 E.
Apr. 2 9.1 E.	5 5.1 E.	7 0.9 E.	9 20.8 E.	11 16.8 E.	13 13.2 E.
5 2.8 E.	7 22.8 E.	9 18.6 E.	12 14.4 E.	14 10.5 E.	16 6.9 E.
7 20.5 E.	10 16.4 E.	12 12.2 E.	15 8.1 E.	17 4.2 E.	19 0.6 E.
10 14.2 E.	13 10.1 E.	15 5.9 E.	18 1.7 E.	19 21.9 E.	21 18.4 E.
13 7.8 E.	16 3.8 E.	17 23.5 E.	20 19.4 E.	22 15.6 E.	24 12.1 E.
16 1.5 E.	18 21.4 E.	20 17.2 E.	23 13.1 E.	25 9.3 E.	27 5.8 E.
18 19.2 E.	21 15.1 E.	23 10.8 E.	26 6.7 E.	28 3.0 E.	29 23.5 E.

RHEA.			TITAN.			HYPERION.		
	d	h		d	h		d	h
Mar.	19	21.2 E.	June	27	5.0 E.	Apr.	3	11.9 S.
	24	9.7 E.	July	1	17.3 E.		7	8.7 E.
	28	22.1 B.		6	5.7 E.		11	8.7 I.
Apr.	2	10.5 E.		10	18.0 E.		15	11.1 W.
	6	22.9 E.		15	6.4 E.		19	10.4 S.
	11	11.3 E.		19	18.7 E.		23	7.0 E.
	15	23.7 E.		24	7.1 E.		27	6.8 I.
	20	12.1 E.		28	19.4 E.	May	1	9.2 W.
	25	0.4 E.	Aug.	2	7.8 E.		5	8.2 S.
	29	12.8 E.		6	20.2 E.		9	4.9 E.
May	4	1.2 E.		11	8.6 E.		13	4.8 I.
	8	13.5 E.		15	21.0 E.		17	7.0 W.
	13	1.8 E.		20	9.5 E.		21	5.9 S.
	17	14.2 E.		24	21.9 E.		25	2.5 E.
	22	2.5 E.		29	10.4 E.		29	2.3 I.
	26	14.8 E.	Sept.	2	22.8 E.	June	2	4.4 W.
	31	3.1 E.		7	11.3 E.		6	3.4 S.
June	4	15.4 E.		11	23.8 E.		9	23.8 E.
	9	3.8 E.		16	12.3 E.		13	23.6 I.
	13	16.1 E.		21	0.8 E.		18	1.6 W.
	18	4.4 E.		25	13.3 E.		22	0.7 S.
	22	16.7 E.		30	1.8 E.		25	21.2 E.

IAPETUS.

Mar. 12.2 W.	Apr. 21.0 E.	May 30.1 W.	July 8.1 E.	Aug. 16.4 W.	Sept. 25.3 E.
Apr. 1.9 S.	May 9.9 I.	June 19.3 S.	27.0 I.	Sept. 6.0 S.	Oct. 14.8 I.

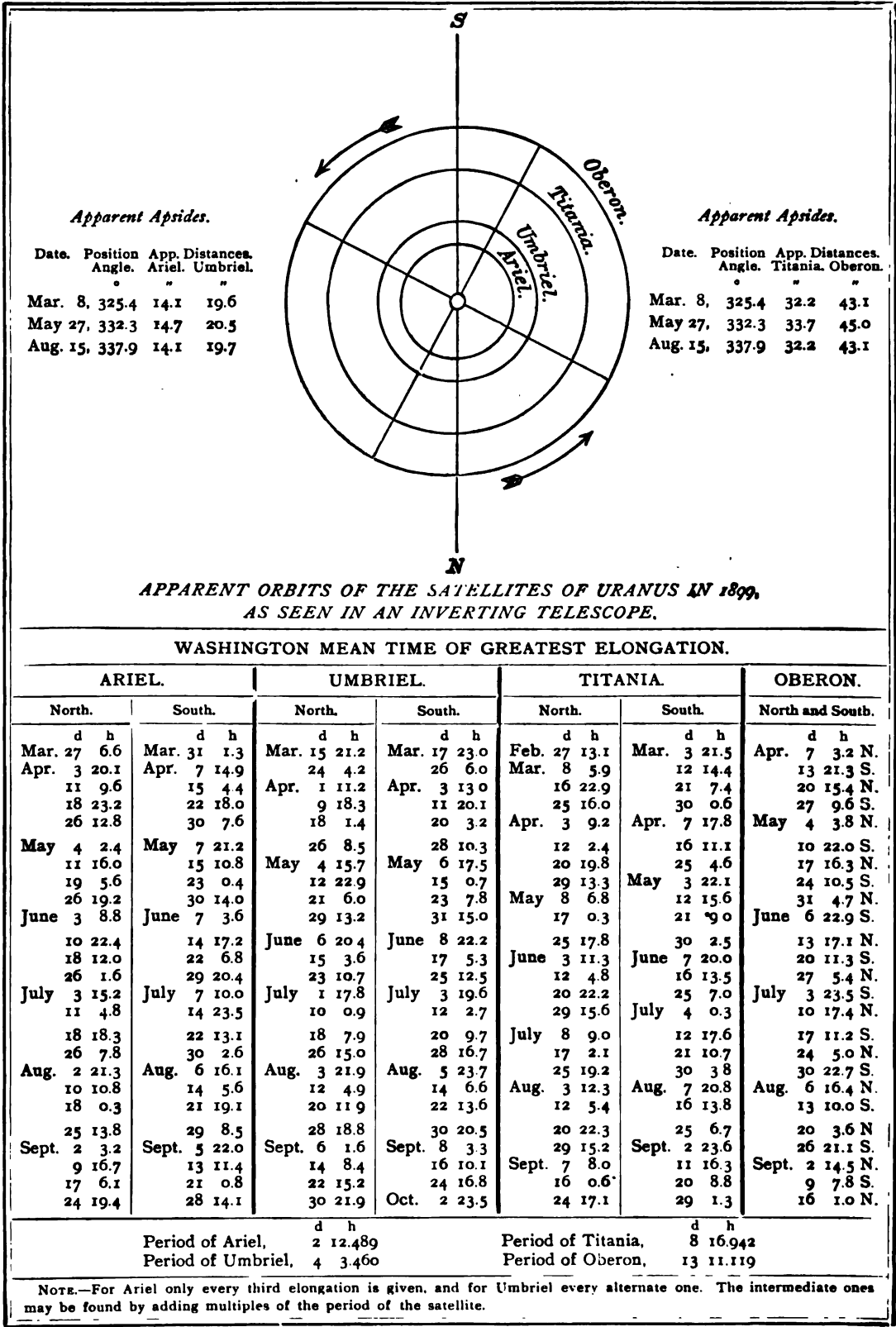
THE APPARENT ELEMENTS OF SATURN'S RINGS.

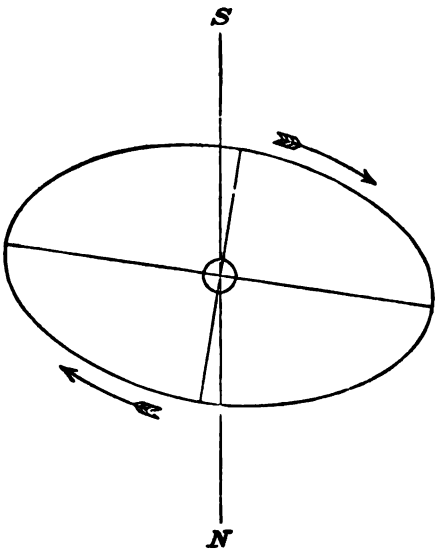
Greenwich Mean Noon.	a	b	p Inclination of Northern Semi-Minor Axis to Circle of Declination from North to East.	l The Elevation of the Earth above the Plane of the Ring.	l' The Elevation of the Sun above the Plane of the Ring.	Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on the—	
						Equator.	Ecliptic.
Jan. 0	34.27	15.44	+4 58.5	+26 47.0	+26 37.6	311 41.6	269 23.5
20	34.82	15.68	+5 12.5	+26 46.2	+26 39.7	314 4.5	271 46.6
Feb. 9	35.66	16.03	+5 23.9	+26 43.0	+26 41.5	316 4.4	273 46.6
Mar. 1	36.74	16.48	+5 31.9	+26 38.8	+26 43.2	317 32.0	275 14.2
21	37.97	16.99	+5 36.1	+26 35.2	+26 44.7	318 19.9	276 2.2
Apr. 10	39.23	17.54	+5 36.4	+26 33.5	+26 45.9	318 24.1	276 6.5
30	40.35	18.05	+5 32.9	+26 33.9	+26 47.0	317 45.6	275 28.1
May 20	41.15	18.43	+5 26.1	+26 36.2	+26 47.9	316 31.8	274 14.4
June 9	41.48	18.61	+5 17.3	+26 39.4	+26 48.6	314 57.2	272 39.9
29	41.27	18.55	+5 8.0	+26 42.6	+26 49.1	313 20.4	271 3.2
July 19	40.57	18.27	+5 0.2	+26 45.8	+26 49.4	312 0.5	269 43.3
Aug. 8	39.51	17.83	+4 55.6	+26 49.2	+26 49.6	311 12.7	268 55.6
28	38.28	17.31	+4 54.9	+26 53.0	+26 49.5	311 5.6	268 48.6
Sept. 17	37.03	16.78	+4 58.7	+26 57.1	+26 49.2	311 41.8	269 24.8
Oct. 7	35.90	16.30	+5 6.4	+27 0.6	+26 48.8	312 58.2	270 41.4
27	34.99	15.90	+5 17.3	+27 2.3	+26 48.2	314 48.8	272 32.0
Nov. 16	34.34	15.60	+5 30.1	+27 1.1	+26 47.3	317 5.0	274 48.3
Dec. 6	34.00	15.40	+5 43.7	+26 56.2	+26 46.3	319 37.2	277 20.6
26	33.98	15.32	+5 57.1	+26 47.6	+26 45.1	322 15.1	279 58.6
31	34.02	15.31	+6 0.2	+26 44.8	+26 44.7	322 54.2	280 37.8

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring = 0.8801,	log factor = 9.9445
The outer ellipse of the inner ring = 0.8599,	log factor = 9.9344
The inner ellipse of the inner ring = 0.6650,	log factor = 9.8228
The inner ellipse of the dusky ring = 0.5486,	log factor = 9.7392

NOTE.—The positive sign of *l* indicates that the visible surface of the ring is the northern one.





Data.	Position Angle of Apsis.	Apparent Distance at Apsis.
Feb. 4.	257.8	+ 16.7
Sept. 28.	263.2	+ 16.9
Dec. 17.	261.6	+ 16.9

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE IN 1899,  
AS SEEN IN AN INVERTING TELESCOPE.

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

East.		West.		East.		West.		East.		West.	
Jan.	d h	Jan.	d h	Mar.	d h	Mar.	d h	Nov.	d h	Nov.	d h
	0 11.0		3 9.5		12 0.1		14 22.6		1 23.6		4 22.1
	6 8.1		9 6.6						7 20.7		10 19.2
	12 5.2		15 3.8	Sept.	4 5.1		7 3.6		13 17.8		16 16.3
	18 2.3		21 0.8		10 2.1		13 0.6		19 14.8		22 13.4
	23 23.4		26 22.0		15 23.2		18 21.7		25 11.9		28 10.5
	29 20.5	Feb.	1 19.1		21 20.2		24 18.7	Dec.	1 9.0	Dec.	4 7.6
Feb.	4 17.6		7 16.2		27 17.2		30 15.7		7 6.2		10 4.7
	10 14.7		13 13.3	Oct.	3 14.2		6 12.8		13 3.3		16 1.8
	16 11.8		19 10.4		9 11.3		12 9.8		19 0.4		21 23.0
	22 8.9		25 7.5		15 8.3		18 6.9		24 21.5		27 20.1
	28 6.0	Mar.	3 4.5		21 5.4		24 3.9		30 18.6	Jan.	2 17.2
Mar.	6 3.0		9 1.6		27 2.5		30 1.0	Jan.	5 15.7		

The above times are those of each passage of the satellite through the apsis of its apparent orbit. The position of the satellite at any time may be found by measuring around the orbit from the apsis last passed through, remembering that the radius vector of the satellite describes equal areas in equal times.

Period of the satellite of Neptune, 5<sup>d</sup> 21<sup>h</sup>.045.

NOTE.—In the preceding diagrams the central circle represents the planet and is on the same scale as the orbits.

## WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

d h m			d h m		
Jan.			Apr.		
4	1	-	1	12	-
5	11	-	1	19	-
6	6	9	6	16	1
7	7	-	8	12	-
8	6	0	9	20	26
8	9	15	11	15	-
9	1	45	14	7	23
9	13	52	17	14	50
11	-	-	19	16	-
11	4	-	23	1	-
18	6	-	24	0	-
21	16	-	25	2	-
22	8	47	25	5	39
25	3	-	27	10	40
25	7	5	28	13	37
28	13	-	29	14	-
29	8	-	29	21	-
31	22	-	May 6	12	16
Feb. 2	18	20	7	4	28
4	17	1	9	12	-
5	15	57	11	17	25
6	8	16	16	2	2
8	20	2	20	6	-
9	23	-	22	6	-
18	14	25	22	9	17
20	23	40	24	17	20
21	7	-	25	18	49
23	16	-	26	21	-
26	1	-	June 5	8	30
26	22	-	6	19	40
26	22	-	7	-	-
Mar. 2	0	58	8	2	56
2	15	-	8	6	-
4	0	28	10	21	-
4	7	-	12	21	-
5	2	13	13	17	12
7	20	45	14	2	-
12	2	-	14	14	-
12	4	19	15	4	-
12	7	-	18	15	50
12	9	-	20	23	-
13	11	-	21	1	28
16	21	-	22	1	46
17	22	1	22	-	-
20	3	-	23	4	-
20	11	52	27	11	-
24	11	-	July 3	18	-
26	10	-	5	9	26
27	5	-	5	11	20
29	3	45	6	5	-
31	5	34	9	10	17
Apr. 1	8	47	12	9	51

## PLANETARY CONSTELLATIONS.

				July				Aug.				Sept.				Oct.				Nov.				Dec.			
d	h	m		d	h	m		d	h	m		d	h	m		d	h	m		d	h	m		d	h	m	
16	15	-		16	15	-		23	20	-		29	2	1		8	20	-		3	14	-		29	1	3	
17	13	-		17	13	-		26	20	-		4	5	-		9	22	-		3	19	45		17	0	-	
18	10	10		18	10	10		3	23	-		4	9	20		10	8	-		4	7	10		17	12	-	
19	9	2		19	9	2		4	19	21		4	14	-		11	1	-		4	8	5		21	8	-	
21	19	-		21	19	-		7	10	48		7	19	23		11	1	22		5	16	59		22	12	-	
																12	0	42									
																						</					



## POSITIONS OF OBSERVATORIES.

(North Latitudes and West Longitudes are Considered Positive.)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Abastuman . . . . .	+ 41 42 24	- 11 35.5	9.999351	- 7 59 41	- 2 51 25
Åbo . . . . .	+ 60 26 56.8	- 10 2.1	9.998867	- 6 37 22.12	- 1 29 6.41
Adelaide . . . . .	- 34 55 38.5	+ 10 56.8	9.999520	- 14 22 35.97	- 9 14 20.30
Albany ( <i>New Obs.</i> ) . . . . .	+ 42 39 12.7	- 11 38.0	9.999326	- 0 13 8.9	+ 4 55 6.8
Albany ( <i>Old Obs.</i> ) . . . . .	+ 42 39 49.5	- 11 38.0	9.999326	- 0 13 16.49	+ 4 54 59.22
Alfred ( <i>N. Y.</i> ) . . . . .	+ 42 15 19.8	- 11 37.0	9.999337	+ 0 2 51.33	+ 5 11 7.04
Algiers ( <i>Old Obs.</i> ) . . . . .	+ 36 44 0	- 11 10.8	9.999476	- 5 20 32.5	- 0 12 16.8
Algiers ( <i>New Obs.</i> ) . . . . .	+ 36 47 50	- 11 11.3	9.999474	- 5 20 24.26	- 0 12 8.55
Allegheny . . . . .	+ 40 27 41.6	- 11 31.3	9.999383	+ 0 11 47.22	+ 5 20 2.93
Altona . . . . .	+ 53 32 45.3	- 11 10.2	9.999049	- 5 48 2.06	- 0 39 46.35
Amherst . . . . .	+ 42 22 17.1	- 11 37.3	9.999334	- 0 18 11.04	+ 4 50 4.67
Annapolis . . . . .	+ 38 58 53.5	- 11 24.5	9.999420	- 0 2 19.22	+ 5 5 56.49
Ann Arbor . . . . .	+ 42 16 48.0	- 11 37.0	9.999336	+ 0 26 39.48	+ 5 34 55.19
Arequipa ( <i>Harvard</i> ) . . . . .	- 16 24	+ 6 18.4	9.999884	- 0 22 46	+ 4 45 30
Armagh . . . . .	+ 54 21 12.7	- 11 4.2	9.999029	- 4 41 40.3	+ 0 26 35.4
Athens . . . . .	+ 37 58 20.7	- 11 18.9	9.999445	- 6 43 10.6	- 1 34 54.9
Bamberg . . . . .	+ 49 53 5	- 11 30.7	9.999141	- 5 51 49.1	- 0 43 33.4
Beloit . . . . .	+ 42 30 9.0	- 11 37.6	9.999331	+ 0 47 51.6	+ 5 56 7.3
Bergen . . . . .	+ 60 23 54	- 10 2.7	9.998888	- 5 29 28.5	- 0 21 12.8
Berkeley . . . . .	+ 37 52 21.7	- 11 18.3	9.999448	+ 3 0 46.66	+ 8 9 2.37
Berlin . . . . .	+ 52 30 16.7	- 11 17.1	9.999075	- 6 1 50.62	- 0 53 34.91
Berlin ( <i>Urania</i> ) . . . . .	+ 52 31 30.7	- 11 17.0	9.999075	- 6 1 43.22	- 0 53 27.51
Berne . . . . .	+ 46 57 8.7	- 11 39.0	9.999216	- 5 38 1.4	- 0 29 45.7
Besançon . . . . .	+ 47 14 59.0	- 11 38.5	9.999208	- 5 32 12.9	- 0 23 57.2
Bethlehem . . . . .	+ 40 36 23.4	- 11 31.9	9.999379	- 0 6 43.86	+ 5 1 31.85
Birr Castle . . . . .	+ 53 5 47.0	- 11 13.3	9.999060	- 4 36 34.8	+ 0 31 40.9
Bogota . . . . .	+ 4 35 48	- 1 51.5	9.999991	- 0 11 17	+ 4 56 59
Bologna . . . . .	+ 44 29 47.0	- 11 40.3	9.999279	- 5 53 40.6	- 0 45 24.9
Bombay . . . . .	+ 18 53 45	- 7 8.1	9.999847	- 9 59 31.45	- 4 51 15.74
Bonn . . . . .	+ 50 43 45.0	- 11 26.9	9.999120	- 5 36 39.00	- 0 28 23.29
Bordeaux . . . . .	+ 44 50 7.2	- 11 40.4	9.999271	- 5 6 10.30	+ 0 2 5.41
Boston ( <i>University</i> ) . . . . .	+ 42 21 32.5	- 11 37.2	9.999334	- 0 24 0.7	+ 4 44 15.0
Bothkamp . . . . .	+ 54 12 9.6	- 11 5.3	9.999033	- 5 48 46.9	- 0 40 31.2
Breslau . . . . .	+ 51 6 56.5	- 11 25.0	9.999110	- 6 16 24.55	- 1 8 8.84
Brisbane . . . . .	- 27 28 0.0	+ 9 32.2	9.999689	- 15 20 22.11	- 10 12 6.40
Brussels ( <i>Uccle</i> ) . . . . .	+ 50 47 53	- 11 26.6	9.999118	- 5 25 41.9	- 0 17 26.2
Brussels ( <i>Old Obs.</i> ) . . . . .	+ 50 51 10.7	- 11 26.3	9.999117	- 5 25 44.4	- 0 17 28.7
Budapest . . . . .	+ 47 29 34.7	- 11 38.0	9.999202	- 6 24 31.1	- 1 16 15.4
Cairo . . . . .	+ 30 4 38.2	- 10 6.5	9.999632	- 7 13 24.62	- 2 5 8.91
Cambridge ( <i>England</i> ) . . . . .	+ 52 12 51.6	- 11 18.9	9.999082	- 5 8 38.46	- 0 0 22.75
Cambridge ( <i>Mass.</i> ) . . . . .	+ 42 22 47.6	- 11 37.3	9.999334	- 0 23 44.72	+ 4 44 30.99
Cape of Good Hope . . . . .	- 33 56 3.6	+ 10 48.0	9.999543	- 6 22 10.47	- 1 13 54.76
Catania . . . . .	+ 37 30 13.3	- 11 16.0	9.999457	- 6 8 35	- 1 0 19
Chapultepec . . . . .	+ 19 25 17.5	- 7 18.2	9.999838	+ 1 28 22.53	+ 6 36 38.24
Charkow . . . . .	+ 50 0 9.6	- 11 30.2	9.999138	- 7 33 11.48	- 2 24 55.77

## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Charlottesville . . .	+ 38 2 1.2	- 11 19.3	9.999444	+ 0 5 49.51	+ 5 14 5.22
Chicago ( <i>Old Obs.</i> ) . .	+ 41 50 1.0	- 11 35.9	9.999348	+ 0 42 11.02	+ 5 50 26.73
Christiania . . .	+ 59 54 44.0	- 10 8.7	9.998899	- 5 51 9.29	- 0 42 53.58
Cincinnati ( <i>New Obs.</i> ) .	+ 39 8 19.5	- 11 25.4	9.999416	+ 0 29 25.58	+ 5 37 41.29
Cincinnati ( <i>Old Obs.</i> ) .	+ 39 6 26.5	- 11 25.2	9.999417	+ 0 29 43.34	+ 5 37 59.05
Clinton . . .	+ 43 3 17.0	- 11 38.7	9.999316	- 0 6 38.26	+ 5 1 37.45
Coimbra . . .	+ 40 12 24.5	- 11 30.3	9.999389	- 4 34 32.6	+ 0 33 43.1
Columbia ( <i>Missouri</i> ) . .	+ 38 56 51.7	- 11 24.4	9.999421	+ 1 1 2.62	+ 6 9 18.33
Copenhagen . . .	+ 55 41 12.9	- 10 53.1	9.998997	- 5 58 34.47	- 0 50 18.76
Cordoba . . .	- 31 25 15.5	+ 10 22.2	9.999602	- 0 51 27.5	+ 4 16 48.2
Cracow . . .	+ 50 3 51.9	- 11 29.9	9.999137	- 6 28 6.08	- 1 19 50.37
Crowborough . . .	+ 51 3 6.5	- 11 25.4	9.999112	- 5 8 53.0	- 0 0 37.3
Dantzig . . .	+ 54 21 18.0	- 11 4.1	9.999029	- 6 22 55.3	- 1 14 39.6
Denver . . .	+ 39 40 36.4	- 11 27.9	9.999402	+ 1 51 31.92	+ 6 59 47.63
Dorpat . . .	+ 58 22 47.1	- 10 26.4	9.998934	- 6 55 9.06	- 1 46 53.35
Dresden . . .	+ 51 2 16.8	- 11 25.4	9.999112	- 6 3 10.55	- 0 54 54.84
Dublin . . .	+ 53 23 13.0	- 11 11.3	9.999053	- 4 42 54.6	+ 0 25 21.1
Dun Echt . . .	+ 57 9 36	- 10 39.2	9.998962	- 4 58 35.7	+ 0 9 40.0
Durham . . .	+ 54 46 6.2	- 11 0.9	9.999019	- 5 1 55.96	+ 0 6 19.75
Düsseldorf . . .	+ 51 12 25.0	- 11 24.6	9.999108	- 5 35 21.2	- 0 27 5.5
Edinburgh . . .	+ 55 57 23.2	- 10 50.7	9.998991	- 4 55 32.66	+ 0 12 43.05
Evanston ( <i>Dearborn</i> ) . .	+ 42 3 33.4	- 11 36.5	9.999342	+ 0 42 26.6	+ 5 50 42.3
Florence ( <i>Reale Museo</i> ) .	+ 43 46 4.1	- 11 39.7	9.999298	- 5 53 17.2	- 0 45 1.5
Florence ( <i>Arcetri</i> ) . .	+ 43 45 14.6	- 11 39.7	9.999298	- 5 53 17.11	- 0 45 1.40
Geneva . . .	+ 46 11 58.8	- 11 39.9	9.999236	- 5 32 52.48	- 0 24 36.77
Genoa . . .	+ 44 25 9.3	- 11 40.2	9.999281	- 5 43 57.1	- 0 35 41.4
Georgetown . . .	+ 38 54 26.0	- 11 24.2	9.999422	+ 0 0 2.53	+ 5 8 18.24
Glasgow ( <i>Missouri</i> ) . .	+ 39 13 45.6	- 11 25.8	9.999414	+ 1 3 2.26	+ 6 11 17.97
Glasgow ( <i>Scotland</i> ) . .	+ 55 52 42.8	- 10 51.5	9.998993	- 4 51 5.1	+ 0 17 10.55
Gohlis . . .	+ 51 21 35.0	- 11 23.7	9.999104	- 5 57 45.36	- 0 49 29.65
Gotha ( <i>Old Obs.</i> ) . .	+ 50 56 5.2	- 11 26.0	9.999114	- 5 51 10.87	- 0 42 55.16
Gotha . . .	+ 50 56 37.9	- 11 25.9	9.999114	- 5 51 6.27	- 0 42 50.56
Göttingen . . .	+ 51 31 48.2	- 11 22.8	9.999100	- 5 48 2.05	- 0 39 46.34
Graz . . .	+ 47 4 37.2	- 11 38.8	9.999213	- 6 10 4	- 1 1 48
Greenwich . . .	+ 51 28 38.1	- 11 23.1	9.999101	- 5 8 15.71	0 0 0.00
Grignon . . .	+ 47 33 42	- 11 37.8	9.999201	- 5 25 54	- 0 17 38
Hamburg . . .	+ 53 33 7.0	- 11 10.1	9.999049	- 5 48 9.4	- 0 39 53.8
Hanover . . .	+ 43 42 15.3	- 11 39.6	9.999300	- 0 19 7.80	+ 4 49 7.91
Harrow . . .	+ 51 34 47.1	- 11 22.6	9.999098	- 5 6 55.8	+ 0 1 19.86
Hastings-on-Hudson . .	+ 40 59 25	- 11 33.2	9.999369	- 0 12 46.1	+ 4 55 29.6
Haverford . . .	+ 40 0 40.1	- 11 29.4	9.999394	- 0 7 3.01	+ 5 1 12.70
Heidelberg . . .	+ 49 24 35	- 11 32.5	9.999153	- 5 43 4.2	- 0 34 48.5
Helsingfors . . .	+ 60 9 42.6	- 10 5.6	9.998893	- 6 48 4.85	- 1 39 49.14
Hereny . . .	+ 47 15 47.4	- 11 38.4	9.999208	- 6 14 40.4	- 1 6 24.7
Hongkong . . .	+ 22 18 12.2	- 8 10.7	9.999789	- 12 44 57.6	- 7 36 41.86

## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Hudson . . .	+ 41 14 42.6	- 11 34.1	9.999363	+ 0 17 28.45	+ 5 25 44.16
Jamaica . . .	+ 18 24 51	- 6 58.7	9.999854	+ 0 3 13.8	+ 5 11 29.48
Jena ( <i>University</i> ) . . .	+ 50 55 35.6	- 11 26.0	9.999115	- 5 54 36.5	- 0 46 20.8
Kalocsa . . .	+ 46 31 42	- 11 39.6	9.999227	- 6 24 10.0	- 1 15 54.3
Karlsruhe . . .	+ 49 0 29.6	- 11 33.9	9.999163	- 5 41 52.2	- 0 33 36.5
Kasan . . .	+ 55 47 24.4	- 10 52.2	9.998995	- 8 24 44.78	- 3 16 29.07
Kew . . .	+ 51 28 6	- 11 23.2	9.999101	- 5 7 0.6	+ 0 1 15.1
Kiel . . .	+ 54 20 28.5	- 11 4.2	9.999030	- 5 48 51.40	- 0 40 35.69
Kiew . . .	+ 50 27 10.5	- 11 28.2	9.999127	- 7 10 16.44	- 2 2 0.73
Kis Kartal . . .	+ 47 41 54.8	- 11 37.5	9.999197	- 6 26 27.4	- 1 18 11.7
Königsberg . . .	+ 54 42 50.4	- 11 1.3	9.999021	- 6 30 14.82	- 1 21 59.11
Kremsmünster . . .	+ 48 3 23.1	- 11 36.7	9.999188	- 6 4 47.35	- 0 56 31.64
La Plata . . .	- 34 54 30.3	+ 10 56.7	9.999520	- 1 16 38.7	+ 3 51 37.0
Leiden . . .	+ 52 9 20.0	- 11 19.3	9.999084	- 5 26 11.93	- 0 17 56.22
Leipzig . . .	+ 51 20 5.9	- 11 23.9	9.999104	- 5 57 49.73	- 0 49 34.02
Liege ( <i>Ougrée</i> ) . . .	+ 50 37 7	- 11 27.5	9.999123	- 5 30 30.9	- 0 22 15.2
Lisbon ( <i>Marine Obs.</i> ) . . .	+ 38 42 17.6	- 11 23.3	9.999427	- 4 31 42.2	+ 0 36 33.5
Lisbon ( <i>Royal Obs.</i> ) . . .	+ 38 42 31.3	- 11 23.1	9.999427	- 4 31 31.03	+ 0 36 44.68
Liverpool . . .	+ 53 24 4.8	- 11 11.2	9.999053	- 4 55 58.38	+ 0 12 17.33
Lübec . . .	+ 53 51 31.1	- 11 7.9	9.999042	- 5 51 1.4	- 0 42 45.7
Lund . . .	+ 55 41 51.6	- 10 53.0	9.998997	- 6 1 0.73	- 0 52 45.02
Lussinpiccolo ( <i>Manora</i> ) . . .	+ 44 32 11	- 11 40.3	9.999278	- 6 6 8.12	- 0 57 52.41
Lyons . . .	+ 45 41 40.9	- 11 40.3	9.999248	- 5 27 24.33	- 0 19 8.62
Madison . . .	+ 43 4 37.0	- 11 38.7	9.999316	+ 0 49 22.11	+ 5 57 37.82
Madras . . .	+ 13 4 8.1	- 5 7.6	9.999925	- 10 29 15.06	- 5 20 59.35
Madrid . . .	+ 40 24 29.7	- 11 31.1	9.999384	- 4 53 30.7	+ 0 14 45.0
Manilla . . .	+ 14 35 25	- 5 40.5	9.999907	- 13 12 6	- 8 3 50
Mannheim . . .	+ 49 29 11.0	- 11 32.2	9.999151	- 5 42 6.23	- 0 33 50.52
Marburg . . .	+ 50 48 46.9	- 11 26.5	9.999118	- 5 43 20.7	- 0 35 5.0
Markree . . .	+ 54 10 31.8	- 11 5.5	9.999034	- 4 34 27.3	+ 0 33 48.4
Marseilles . . .	+ 43 18 17.5	- 11 39.1	9.999310	- 5 29 50.35	- 0 21 34.64
Mauritius . . .	- 20 5 39	+ 7 30.8	9.999828	- 8 58 28.3	- 3 50 12.6
Melbourne . . .	- 37 49 53.2	+ 11 18.1	9.999449	- 14 48 9.86	- 9 39 54.15
Meudon . . .	+ 48 48 18	- 11 34.6	9.999169	- 5 17 11.3	- 0 8 55.6
Mexico . . .	+ 19 26 1.3	- 7 18.4	9.999838	+ 1 28 10.96	+ 6 36 26.67
Middletown ( <i>Conn.</i> ) . . .	+ 41 33 16.0	- 11 35.1	9.999355	- 0 17 38.53	+ 4 50 37.18
Milan . . .	+ 45 27 59.2	- 11 40.4	9.999254	- 5 45 1.68	- 0 36 45.97
Modena . . .	+ 44 38 52.8	- 11 40.4	9.999275	- 5 51 58.6	- 0 43 42.9
Moncalieri . . .	+ 44 59 51	- 11 40.4	9.999266	- 5 39 5	- 0 30 49
Montreal . . .	+ 45 30 17.0	- 11 40.4	9.999253	- 0 13 57.17	+ 4 54 18.65
Montsouris . . .	+ 48 49 18.0	- 11 34.5	9.999168	- 5 17 36.39	- 0 9 20.68
Moscow . . .	+ 55 45 19.8	- 10 52.5	9.998995	- 7 38 32.88	- 2 30 17.17
Mount Hamilton . . .	+ 37 20 24.6	- 11 14.9	9.999461	+ 2 58 19.10	+ 8 6 34.81
Munich . . .	+ 48 8 45.5	- 11 36.5	9.999186	- 5 54 41.84	- 0 46 26.13
Naples . . .	+ 40 51 46.0	- 11 32.8	9.999372	- 6 5 17.50	- 0 57 1.79

## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Nashville . . .	+36 8 54.4	-11 6.6	9.999490	+ 0 38 56.5	+ 5 47 12.2
Natal . . .	-29 50 46.6	+10 3.7	9.999637	- 7 12 16.89	- 2 4 1.18
Neuchatel . . .	+47 0 1.2	-11 38.9	9.999215	- 5 36 5.57	- 0 27 49.86
New Haven ( <i>Old Obs'y</i> )	+41 18 36.5	-11 34.3	9.999361	- 0 16 33.57	+ 4 51 42.14
New Haven ( <i>Yale Univ.</i> )	+41 19 22.3	-11 34.4	9.999361	- 0 16 35.15	+ 4 51 40.56
New York ( <i>Columb. Coll.</i> )	+40 45 23.1	-11 32.4	9.999375	- 0 12 22.07	+ 4 55 53.64
New York ( <i>RUTHERFURD</i> )	+40 43 48.5	-11 32.3	9.999376	- 0 12 19	+ 4 55 57
Nice . . .	+43 43 16.9	-11 39.6	9.999299	- 5 37 27.96	- 0 29 12.25
Nicolaëff . . .	+46 58 21.3	-11 38.9	9.999216	- 7 16 9.58	- 2 7 53.87
Northfield . . .	+44 27 41.6	-11 40.3	9.999280	+ 1 4 20.10	+ 6 12 35.81
Oakland ( <i>Cal.</i> ) . . .	+37 48 5	-11 17.9	9.999449	+ 3 0 50.91	+ 8 9 6.62
Odessa . . .	+46 28 36.7	-11 39.6	9.999228	- 7 11 17.87	- 2 3 2.16
Ogden . . .	+41 13 8.6	-11 34.0	9.999363	+ 2 19 43.85	+ 7 27 59.56
O-Gyalla . . .	+47 52 27.3	-11 37.1	9.999192	- 6 21 1.31	- 1 12 45.60
Olmütz . . .	+49 35 43	-11 31.8	9.999149	- 6 17 24	- 1 9 8
Oxford ( <i>Mississippi</i> ) . . .	+34 22 12.6	-10 52.0	9.999533	+ 0 49 51.4	+ 5 58 7.1
Oxford ( <i>Radcliffe</i> ) . . .	+51 45 35.4	-11 21.6	9.999094	- 5 3 13.1	+ 0 5 2.6
Oxford ( <i>University</i> ) . . .	+51 45 34.2	-11 21.6	9.999094	- 5 3 15.3	+ 0 5 0.4
Padua . . .	+45 24 2.5	-11 40.4	9.999256	- 5 55 44.91	- 0 47 29.20
Palermo . . .	+38 6 44.0	-11 19.7	9.999442	- 6 1 41.68	- 0 53 25.97
Paramatta . . .	-33 48 49.8	+10 46.9	9.999546	-15 12 15.9	-10 4 0.2
Paris . . .	+48 50 11.2	-11 34.5	9.999168	- 5 17 36.74	- 0 9 21.03
Philadelphia . . .	+39 57 7.5	-11 29.2	9.999396	- 0 7 37.25	+ 5 0 38.46
Plonsk . . .	+52 37 40.0	-11 16.4	9.999072	- 6 29 47.7	- 1 21 32.0
Pola . . .	+44 51 48.7	-11 40.4	9.999270	- 6 3 38.65	- 0 55 22.94
Portsmouth . . .	+50 48 3	-11 26.6	9.999118	- 5 3 50.9	+ 0 4 24.8
Potsdam . . .	+52 22 56.0	-11 17.9	9.999078	- 6 0 31.6	- 0 52 15.9
Poughkeepsie . . .	+41 41 18	-11 35.5	9.999351	- 0 12 42.1	+ 4 55 33.6
Prague ( <i>University</i> ) . . .	+50 5 15.8	-11 29.8	9.999136	- 6 5 56.0	- 0 57 40.3
Princeton . . .	+40 20 57.8	-11 30.8	9.999385	- 0 9 38.21	+ 4 58 37.50
Princeton ( <i>Halsted</i> ) . . .	+40 20 55.8	-11 30.9	9.999386	- 0 9 36.27	+ 4 58 39.44
Providence ( <i>SEAGRAVE</i> ) . . .	+41 49 46	-11 35.9	9.999348	- 0 22 38.19	+ 4 45 37.52
Providence ( <i>Ladd</i> ) . . .	+41 50 21	-11 35.9	9.999348	- 0 22 39.76	+ 4 45 35.95
Pulkowa . . .	+59 46 18.7	-10 10.4	9.998902	- 7 9 34.38	- 2 1 18.67
Quebec . . .	+46 47 59.2	-11 39.2	9.999220	- 0 23 23.07	+ 4 44 52.64
Quito . . .	- 0 14 0	+ 0 5.7	0.000000	+ 0 7 4	+ 5 15 20
Riga . . .	+56 57 7	-10 41.3	9.998967	- 6 44 44	- 1 36 28
Rio de Janeiro . . .	-22 54 23.7	+ 8 21.1	9.999779	- 2 15 34.3	+ 2 52 41.4
Rochester . . .	+43 9 16.8	-11 38.8	9.999314	+ 0 2 6.07	+ 5 10 21.78
Rome ( <i>Coll. Rom.</i> ) . . .	+41 53 53.6	-11 36.1	9.999346	- 5 58 11.26	- 0 49 55.55
Rome ( <i>Capitol</i> ) . . .	+41 53 33.5	-11 36.0	9.999346	- 5 58 12.14	- 0 49 56.43
Rome ( <i>Vatican</i> ) . . .	+41 54 4.8	-11 36.1	9.999346	- 5 58 5.1	- 0 49 49.4
Rousdon . . .	+50 42 38	-11 27.0	9.999120	- 4 56 16.77	+ 0 11 58.94
Rugby . . .	+52 22 7	-11 18.0	9.999079	- 5 3 13.7	+ 0 5 2.0
San Fernando . . .	+36 27 41.5	-11 8.9	9.999483	- 4 43 26.1	+ 0 24 49.2

## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
San Francisco . . .	+ 37 47 27.9	- 11 17.8	9.999450	+ 3 1 27.06	+ 8 9 42.77
Santiago de Chile . .	- 33 26 42.0	+ 10 43.4	9.999555	- 0 25 29.4	+ 4 42 46.3
Schwerin . . .	+ 53 37 37.9	- 11 9.6	9.999047	- 5 53 56.6	- 0 45 40.9
South Hadley . . .	+ 42 15 18.2	- 11 37.0	9.999337	- 0 17 55.42	+ 4 50 20.29
Speier . . .	+ 49 18 55.2	- 11 32.9	9.999156	- 5 42 1.33	- 0 33 45.62
St. Louis . . .	+ 38 38 3.6	- 11 22.7	9.999429	+ 0 52 33.40	+ 6 0 49.11
St. Petersburg ( <i>Academy</i> )	+ 59 56 29.7	- 10 8.4	9.998898	- 7 9 29.17	- 2 1 13.46
St. Petersburg ( <i>Univ.</i> )	+ 59 56 32.0	- 10 8.4	9.998898	- 7 9 27.12	- 2 1 11.41
Stockholm . . .	+ 59 20 33.0	- 10 15.5	9.998912	- 6 20 29.70	- 1 12 13.99
Stonyhurst . . .	+ 53 50 40	- 11 8.0	9.999042	- 4 58 23.03	+ 0 9 52.68
Strassburg ( <i>New Obs.</i> )	+ 48 35 0.8	- 11 35.3	9.999174	- 5 39 20.36	- 0 31 4.65
Strassburg ( <i>Old Obs.</i> )	+ 48 34 53.8	- 11 35.3	9.999174	- 5 39 18.20	- 0 31 2.49
Sydney . . .	- 33 51 41.1	+ 10 47.3	9.999545	- 15 13 5.25	- 10 4 49.54
Syracuse . . .	+ 43 2 13.1	- 11 38.6	9.999317	- 0 3 42.35	+ 5 4 33.36
Tacubaya . . .	+ 19 24 17.5	- 7 17.8	9.999839	+ 1 28 30.82	+ 6 36 46.53
Taschkent . . .	+ 41 19 31.4	- 11 34.4	9.999361	- 9 45 26.51	- 4 37 10.80
Tokio . . .	+ 35 39 17.5	- 11 2.8	9.999502	- 14 27 13.7	- 9 18 58.0
Toronto . . .	+ 43 39 35.9	- 11 39.6	9.999301	+ 0 9 18.94	+ 5 17 34.65
Toulouse . . .	+ 43 36 45.3	- 11 39.5	9.999302	- 5 14 5.6	- 0 5 49.9
Trieste . . .	+ 45 38 45.4	- 11 40.3	9.999250	- 6 3 18.72	- 0 55 3.01
Troy ( <i>N. Y.</i> ) . . .	+ 42 43 52.9	- 11 38.1	9.999325	- 0 13 33.42	+ 4 54 42.29
Tulse Hill . . .	+ 51 26 47.0	- 11 23.3	9.999102	- 5 7 48.0	+ 0 0 27.7
Turin . . .	+ 45 4 8.0	- 11 40.4	9.999265	- 5 39 2.94	- 0 30 47.23
Twickenham . . .	+ 51 27 4.2	- 11 23.3	9.999102	- 5 7 2.6	+ 0 1 13.1
Upsala ( <i>New Obs.</i> ) . .	+ 59 51 29.4	- 10 9.3	9.998900	- 6 18 45.94	- 1 10 30.23
Utrecht . . .	+ 52 5 9.5	- 11 19.7	9.999086	- 5 28 46.9	- 0 20 31.2
Venice . . .	+ 45 26 10.5	- 11 40.4	9.999255	- 5 57 37.83	- 0 49 22.12
Vienna ( <i>Josephstadt</i> ) . .	+ 48 12 53.8	- 11 36.2	9.999183	- 6 13 41.0	- 1 5 25.3
Vienna ( <i>New Obs.</i> ) . .	+ 48 13 55.4	- 11 36.2	9.999183	- 6 13 37.20	- 1 5 21.49
Vienna ( <i>Old Obs.</i> ) . .	+ 48 12 35.5	- 11 36.3	9.999184	- 6 13 47.41	- 1 5 31 70
Vienna ( <i>Ottakring</i> ) . .	+ 48 12 46.7	- 11 36.2	9.999183	- 6 13 26.82	- 1 5 11.11
Warsaw . . .	+ 52 13 5.7	- 11 18.9	9.999082	- 6 32 23.1	- 1 24 7.4
Washington . . .	+ 38 55 14.7	- 11 24.2	9.999422	0 0 0.00	+ 5 8 15.71
Washington ( <i>Old Obs.</i> )	+ 38 53 38.8	- 11 24.1	9.999422	- 0 0 3.67	+ 5 8 12.04
Washington ( <i>Smithsonian</i> )	+ 38 53 17.3	- 11 24.1	9.999422	- 0 0 9.5	+ 5 8 6.2
Wellington . . .	- 41 18 0.6	+ 11 34.3	9.999361	- 16 47 22.23	- 11 39 6.52
West Point ( <i>Old Obs.</i> )	+ 41 23 31	- 11 34.6	9.999359	- 0 12 26.38	+ 4 55 49.33
West Point ( <i>New Obs.</i> )	+ 41 23 22.1	- 11 34.6	9.999359	- 0 12 25.16	+ 4 55 50.55
Wilhelmshaven . . .	+ 53 31 52.2	- 11 10.3	9.999050	- 5 40 50.92	- 0 32 35.21
Williamstown ( <i>Mass.</i> ) . .	+ 42 42 30	- 11 38.0	9.999325	- 0 15 26	+ 4 52 50
Williamstown ( <i>Victoria</i> )	- 37 52 7.2	+ 11 18.3	9.999448	- 14 47 54.5	- 9 39 38.8
Wilna . . .	+ 54 40 59.1	- 11 1.6	9.999021	- 6 49 24.58	- 1 41 8.87
Windsor . . .	- 33 36 30.8	+ 10 44.9	9.999551	- 15 11 36.22	- 10 3 20.51
Zürich . . .	+ 47 22 40.0	- 11 38.2	9.999205	- 5 42 28.07	- 0 34 12.36

# ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

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## PART I—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

The greater portion of this Ephemeris, embracing the positions of the sun and moon; the distances of the moon from the centres of the sun and of the four most conspicuous planets, and from certain fixed stars; the ephemerides of the planets Mercury, Venus, Mars, Jupiter, and Saturn, is designed for the special use of navigators. The remainder contains the ephemerides of Uranus and Neptune, the heliocentric co-ordinates of the seven major planets, the rectangular equatorial co-ordinates of the sun, the moon's longitude and latitude, data for the libration of the moon, the obliquity of the ecliptic, the equation of the equinoxes, etc.

### TIME.

Astronomers make use of two different kinds of time; mean solar time, which is to be distinguished from true, or apparent solar time; and sidereal time.

*Solar Time.*—Solar time is that used for all the purposes of ordinary life, and is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour-angle of the sun is called *Solar Time*. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the same meridian are not exactly equal, owing to the varying motion of the earth around the sun, and to the obliquity of the ecliptic. The intervals between the sun's transits over the meridian being unequal it is impossible to regulate a clock or chronometer so that it shall accurately follow the sun.

To avoid the irregularity which would arise from using the true sun as the measure of time, a fictitious sun, called the *Mean Sun*, is supposed to move in the equator with a uniform velocity. This mean sun is supposed to keep, on the average, as near the real sun as is consistent with perfect uniformity of motion; it is sometimes in advance of it, and sometimes behind it, the greatest deviation being about 16 minutes of time.

*Mean Solar Time*, which is perfectly equable in its increase, is measured by the motion of this mean sun. The clocks in ordinary use and the chronometers used by navigators are regulated to mean solar time.

*True, or Apparent Solar Time* is measured by the motion of the real sun.

The difference between apparent and mean time is called the *Equation of Time*. By means of it, we change apparent to mean time, or the reverse. Thus, if the apparent time be given, the mean time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I of the Calendar for each month. If the mean time be given, the apparent time is obtained by applying the equation of time as directed by the precept on page II of the Calendar.

*Sidereal Time.*—Sidereal time is measured by the daily motion of the stars; or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascension of the stars is counted. This point is the vernal equinox, and its hour-angle is called *Sidereal Time*. Astronomical clocks, regulated to sidereal time, are called sidereal clocks.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over the meridian, and its next succeeding return to the same meridian. It is about  $3^m\ 56^s$  shorter than the mean solar day;  $365\frac{1}{4}$  solar days, or a year, being divided into  $366\frac{1}{4}$  sidereal days.

It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian. About March 21st of each year the sidereal clock agrees with the mean time, or ordinary clock, and the former gains on the latter about  $3^m 56^s$  per day, so that at the end of a year it will have gained an entire day, and will again agree with the mean time clock.

*Day.*—The *Civil Day*, according to the customs of society, commences at midnight, and comprises twenty-four hours, from one midnight to the next following. The hours are counted from 0 to 12 from midnight to noon, after which they are again reckoned from 0 to 12 from noon to midnight. Thus the day is divided into two periods of 12 hours each, of which the first is marked A. M., and the last is marked P. M.

The *Astronomical Day* begins at noon on the civil day of the same date. It also comprises twenty-four hours, but they are reckoned from 0 to 24, and from the noon of one day to that of the next following. The astronomical as well as the civil time may be either apparent or mean, according as it is reckoned from apparent noon or from mean noon.

The civil day begins twelve hours before the astronomical day; therefore the first period of the civil day answers to the last part of the preceding astronomical day, and the last period of the civil day corresponds to the first part of the same astronomical day. Thus, January 9th, 2 o'clock, A. M., civil time, is January 8th, 14<sup>h</sup>, astronomical time; and January 9th, 2 o'clock, P. M., civil time, is also January 9th, 2<sup>h</sup>, astronomical time. The rule, then, for the transformation of civil time into astronomical time is this: *If the civil time is marked A. M., take one from the day and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.*

*To change astronomical to civil time, we simply write P. M. after it, if it is less than 12 hours. If greater than 12 hours, we subtract 12 hours from it, add 1 to the days, and write A. M.* For example, January 3d, 23 hours, astronomical time, is January 4th, 11 o'clock, A. M., civil time.

If the longitude from Greenwich be expressed in time, and, when *west*, added to the local time, or, when *east*, subtracted from the local time, the result is the corresponding Greenwich time. If the local mean time is used, the result is the Greenwich mean time, which ordinarily is that required for the use of this Ephemeris. The rule is the same, whether we use mean or sidereal time.

### THE CALENDAR.

The Calendar is divided into twelve months, and to each month are assigned eighteen pages, the contents of which are as follow:—

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension and Declination*, and the *Equation of Time*. Adjoining columns contain the differences of these quantities for one hour. By multiplying this difference by the hours and parts of an hour from Greenwich apparent noon, and adding the amount to, or subtracting it from, the quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of any quantity for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, and, when greater accuracy is required, should be first interpolated for half the hours and parts of an hour of the Greenwich apparent time.

This page is chiefly used when the sun is observed on the meridian, and the local apparent time is  $0^h 0^m 0^s$ . The longitude from Greenwich expressed in time, if west, is at that instant the Greenwich apparent time, or time after Greenwich apparent noon; if east, it is time before Greenwich apparent noon. The longitude of any place is therefore employed in reducing the quantities on this page to apparent noon at the place.

The right ascension of the sun thus reduced is the sidereal time of local apparent noon. The difference between it and the clock time of the meridian passage of the sun is the error of the clock on sidereal time.

The declination of the sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the sun.

As an example of the use of page I:—

Let the sun's declination be required at apparent noon, 1899, May 3, at a place whose longitude is  $179^{\circ} 40'$ , or  $11^{\text{h}} 58^{\text{m}} 40^{\text{s}}$  east from Greenwich:

Local apparent time	May 3,	<sup>h</sup> 0	<sup>m</sup> 0	<sup>s</sup> 0
Longitude from Greenwich (subtractive)		11	58	40
Greenwich apparent time	May 2,	12	1	20

Reducing the minutes and seconds to decimals of an hour, we find that this moment is  $12^{\text{h}}.022$  after Greenwich apparent noon on May 2, or  $11^{\text{h}}.978$  before Greenwich apparent noon on May 3.

On page 74 of the Ephemeris we find that the change of declination in one hour is

May 2, at Greenwich apparent noon	+	44.71
May 3, at Greenwich apparent noon	+	44.07
Difference for one day		0.64

If we want to be very exact, we find the amount of this hourly difference for the time which is half way between Greenwich noon and the time of observation; that is, for 6 hours after Greenwich noon of the 2nd, this being half of 12 hours. Six hours is 0.25 of a day; so the calculation is as follows:—

Difference for one hour, May 2	44.71
Change for 0.25 of a day or $0''.64 \times 0.25$	— 0.16
Difference at 6 hours after noon	44.55
$44''.55 \times 12.022 = 535''.6 = 8' 55''.6$	
Declination at Greenwich noon, May 2	N. 15 23 46.8
Change in 12.022 hours (additive)	8 55.6
Sun's declination at time of observation	N. 15 32 42.4

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given, the time is  $11^{\text{h}}.978$  before Greenwich noon of May 3; half this interval is about 0.25 of a day, and the hourly motion for the middle of the interval is  $44''.23$ . Then, we find:—

Declination at Greenwich noon, May 3	N. 15 41 32.2
Product of $44''.23 \times 11.978 = 529''.8$ (subtractive)	8 49.8
Sun's declination at time of observation	N. 15 32 42.4

It will always be well to make the calculation by both methods, as their agreement will show both to be right.

At sea it is ordinarily sufficient to have the declination to the nearest half minute, and the reduction may be found by Table 12 of BOWDITCH'S *American Practical Navigator*.

The equation of time, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the apparent time, or the time given by an observation of the sun, to obtain the mean time. The heading of the column directs the manner in which the equation is to be applied. When there is a change in the course of the month from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change takes place. The equation of time, as given on page I, is the mean time of apparent noon, or the hour-angle of the mean sun at that instant.



*The Sun's Semidiameter* and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The sun's semidiameter is used in reducing the altitude of the upper or lower limb of the sun to the altitude of the center; and in reducing the angular distance of the limb from the moon or some other object, to the distance from the center of the sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the sun's center over the wires of a transit-instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given, and may be used in reducing them to any Greenwich mean time. The hourly changes may be first interpolated for half the Greenwich time, when great precision is required, in the way described in explaining the calculation of the declination.

The right ascension and declination on pages I and II are affected by aberration, and therefore denote the *apparent* position of the *true* sun. Page II is more conveniently used when the mean time is known. This is the case in most observations of the sun out of the meridian, when the times have been noted by a clock or chronometer regulated to mean time. The quantities on this page can be reduced to mean noon of any place by interpolating for the longitude, as in the example of the sun's declination on the preceding page.

The sun's declination is required in finding the latitude of the place, the *local* time, and the sun's azimuth and amplitude, from observations of the sun.

The equation of time is needed in finding the mean time from observations of the sun, and the latitude from observations out of the meridian. The heading of the column directs the manner in which it is to be applied to mean time to obtain the apparent time.

The equation of time, as given on page II, is the apparent time of mean noon; and is equivalent to the hour-angle of the true sun at the instant of mean noon.

The sidereal time of mean noon is also the right ascension of the mean sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference,  $9^{\text{s}}.8565$ ; or by Table III, appended to this volume, for reducing intervals of mean solar to sidereal time. Table 9 of BOWDITCH's *Navigator* may be used for the same purpose.

The sun's right ascension and the sidereal time of mean noon, or right ascension of the mean sun, are useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the R. A. of the mean sun for this time, as last explained; this being added to the local mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time, gives the interval of sidereal time from noon. Subtracting from this the corresponding reduction of a sidereal interval to a mean time interval, in Table II, appended to this volume, or Table 8 of BOWDITCH's *Navigator*, will give the mean time required. This reduction may also be found by multiplying  $9^{\text{s}}.8296$  by the hours and parts of an hour of the given sidereal time.

As examples of the use of page II:—

1.—Let the sun's right ascension and the equation of time be required for 1899, May 22,  $9^{\text{h}} 2^{\text{m}} 30^{\text{s}}$ , A. M., mean time, at a place whose longitude is  $100^{\circ} 10'$ , or  $6^{\text{h}} 40^{\text{m}} 40^{\text{s}}$ , west of Greenwich.

Local astronomical mean time	May 21,	<sup>h</sup> <sup>m</sup> <sup>s</sup> 21 2 30
Longitude from Greenwich (additive)		6 40 40
Greenwich mean time	May 22,	3 43 10 = $3^{\text{h}}.7194$

*Sun's Right Ascension.*

	h	m	s
May 22, Greenwich noon	3	56	2.64
H. D. $10^{\circ}.034 \times 3.7194$	+	0	37.32
	3	56	39.96

*Equation of Time.*

	m	s
May 22, noon	3	32.33 (additive)
H. D. $-0^{\circ}.177 \times 3.72$	-	0.66
	3	31.67

In this case, the hourly differences interpolated to half the interval, or  $1^{\text{h}}.9$  after noon, have been used.

The equation of time in this example is additive to mean time. Its reduction could also have been found by Table 12 of BOWDITCH'S *Navigator*.

2.—If the sidereal time is required for the same date and time, we have:—

	h	m	s
May 22, Sidereal Time (at Greenwich mean noon)	3	59	34.97
Hourly difference $9^{\circ}.8565 \times 3.7194$	+	36.66	
Add the local astronomical mean time	21	2	30.00
The required sidereal time is (rejecting $24^{\text{h}}$ )	1	2	41.63

The reduction  $0^{\text{m}} 36.66$  could have been found in Table III corresponding to the Greenwich mean time  $3^{\text{h}} 43^{\text{m}} 10^{\text{s}}$  or by Table 9 of BOWDITCH'S *Navigator*.

3.—On 1899, May 22, A. M., at a place whose longitude is  $100^{\circ} 10' \text{ W.}$ , suppose the sidereal time to be  $1^{\text{h}} 2^{\text{m}} 41^{\text{s}}.63$ , and that the corresponding mean time is required.

The astronomical day is May 21; the longitude in time,  $+ 6^{\text{h}} 40^{\text{m}} 40^{\text{s}}$ , or  $+ 6^{\text{h}}.678$ .

	h	m	s
May 21, Sidereal Time (at Greenwich mean noon)	3	55	38.41
The H. D. $9^{\circ}.8565 \times 6.678$ , or the reduction for $6^{\text{h}} 40^{\text{m}} 40^{\text{s}}$ in Table III	+	1	5.82
The sidereal time of local mean noon	3	56	44.23
The given sidereal time ( $+ 24^{\text{h}}$ , if necessary for the following subtraction)	25	2	41.63
Subtracting the first from the second gives the sidereal interval from noon	21	5	57.40 = $21^{\text{h}}.0993$
— $9^{\circ}.8296 \times 21.0993$ or the reduction for $21^{\text{h}} 5^{\text{m}} 57^{\text{s}}.4$ in Table II	-	3	27.40
The required astronomical mean time is	May 21,	21	2 30.00

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude* and *Latitude*, and the *Logarithm of the Radius Vector of the Earth*. The longitudes of the sun are the true geometric longitudes, not corrected for aberration. The longitude is given in two columns, headed  $\lambda$  and  $\lambda'$ ;  $\lambda$  representing the sun's longitude counted from the true equinox of the date; and  $\lambda'$ , the same co-ordinate counted from the mean equinox of the beginning of the year, (January  $0^{\text{d}}.0$ ). A column of hourly differences enables the computer to obtain the sun's longitude for any hour from noon. The hourly differences of the logarithm of the radius vector are likewise given. The latitude is referred to the ecliptic of the date.

The last column on page III contains the *Mean Time of Sidereal Noon*; that is, the number of hours, minutes and seconds after Greenwich mean noon when the first point of Aries passes the meridian of Greenwich. It may be reduced to any meridian by interpolating for the longitude, or to any Greenwich sidereal time by means of the hourly difference,  $-9^{\circ}.8296$ . The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time; or from Table 8 of BOWDITCH'S *Navigator*.

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for May 20, that is the preceding astronomical day.

	h	m	s
May 21, the mean time of Greenwich sidereal noon is	20	1	4.28
The H. D. $-9^{\circ}.8296 \times 6.678$ , or the reduction for longitude, Table II	-	1	5.64
The mean time of local sidereal noon	19	59	58.64
Add the given sidereal time	1	2	41.63 = $1^{\text{h}}.0449$
The sum is	21	2	40.27
— $9^{\circ}.8296 \times 1.0449$ , or the reduction for $1^{\text{h}} 2^{\text{m}} 41^{\text{s}}.63$ in Table II	-	0	10.27
The required astronomical mean time	May 21,	21	2 30.00

Page IV contains *The Moon's Semidiameter* and *Equatorial Horizontal Parallax*, for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of this quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the sun's declination and the equation of time in the preceding examples. The sign plus or minus prefixed to the hourly differences, shows whether the horizontal parallax is increasing or decreasing.

The reduction of the moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.272, or by simply computing the proportional part.

If, for example, the semidiameter of the moon is to be taken out for 1899, January 6, 10<sup>h</sup>, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of January 6 is 7".8; then,

$$12^h : 10^h = 7''.8 : 6''.5,$$

which is the correction to be added to the semidiameter at noon, because the semidiameter is increasing. The moon's semidiameter then, for January 6, 10<sup>h</sup>, is 15' 50".4.

The moon's semidiameter and horizontal parallax are required for all observations of the moon. When great precision is needed, the hourly differences should be first interpolated for half the interval of Greenwich time from noon or midnight, and a correction applied to the horizontal parallax for the latitude of the place of observation.

The *Mean Time of the Moon's Upper Transit at Greenwich*, which is given on page IV to tenths of a minute, is also accompanied with a column of differences for one hour of longitude, by means of which, having the longitude converted into time, the local time of the moon's meridian passage at any other place may be computed. The reduction may be taken by simple inspection from BOWDITCH'S Table 11. The last column of this page contains the *Age* of the moon, or the time elapsed since the preceding new moon, to tenths of a day.

Pages V—XII contain *The Moon's Right Ascension* and *Declination*, for each day and hour of Greenwich mean time. They are accompanied with columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may be taken from a well-regulated chronometer, or obtained by applying the longitude converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the day and hour of the Greenwich mean time; the *Diff. for 1 Minute* multiplied by the minutes and parts of a minute of the Greenwich time, and the product added to, or subtracted from the quantity, according as the quantity is increasing or decreasing.

Thus, suppose the moon's right ascension and declination are required for 1899, August 3, 10<sup>h</sup> 10<sup>m</sup> 30<sup>s</sup>, astronomical mean time at Greenwich:—

<i>Right Ascension.</i>			<i>Declination.</i>		
	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>
August 3, 10 <sup>h</sup>	6	56	53.36	N.	21 31 26.7
Diff. 2 <sup>d</sup> .1085 × 10.5	= + 22.14			5".525 × 10.5	= — 58.0
August 3, 10 <sup>h</sup> 10 <sup>m</sup> 30 <sup>s</sup>	6	57	15.50	N.	21 30 28.7

The differences interpolated for 5<sup>m</sup>.2 = 0<sup>h</sup>.09 are, for the right ascension 2<sup>d</sup>.1085, and for the declination 5".525, which have been used for greater precision.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the earth.

Pages XIII—XVIII contain the *Lunar Distances*, or the angular distances of the centre of the moon from the centre of the sun, and from the four larger planets and certain fixed stars, as they would appear to an observer at the centre of the earth. They are given for every third hour of Greenwich mean time, beginning at noon; the dates are therefore astronomical. All the distances that can be observed on the same day, are grouped together under that date; and the columns are read from left to right, across both pages of the same opening. The letter W. or E. is affixed to the name of the sun, planet or star, to indicate that it is on the west, or east side of the moon.

An observer on the earth's surface having measured a lunar distance, corrected it for errors of his instrument and for the semidiameter of the objects, and cleared it from the effects of refraction and parallax, finds the true or geocentric distance, that is, the distance as it would have appeared from the centre of the earth at the moment of observation. With this distance and the distances in the Ephemeris of the same bodies on the same day, the Greenwich mean time of the observation can be found.

To lessen the labor of computation, there is given in the Ephemeris, between every two successive distances, the logarithm of the seconds of time in which the distance changes 1"; or, as it is usually called, the *Proportional Logarithm of the Difference*. It is given for the middle instant of the two hours between which it is placed.

For computing the Greenwich time we have the following rule:—

*Find in the Almanac the two distances between which the true distance falls; take out the nearer of these, the hours of Greenwich time over it, and the P. L. of Diff. between them.*

Find the difference between the true distance and the distance taken from the Almanac; and from the proportional logarithm of this difference, as found in the Navigator (Table 45), subtract the P. L. of Diff. taken from the Almanac.

The result is the proportional logarithm of an interval of time to be added to the hours of Greenwich time, taken from the Almanac, when the earlier Almanac-distance is used; to be subtracted from the hours of Greenwich time, when the later Almanac-distance is used.

Another method is, to add the common logarithm of the difference of the true and the Almanac-distances to the P. L. of Diff. of the Almanac; the sum will be the common logarithm of the correction to be applied to the hours of Greenwich time. Table 34 of BOWDITCH'S *Navigator* saves the operation of reducing degrees (or hours) and minutes to seconds, and the reverse.

As the P. L. of Diff. in the Ephemeris varies, the Greenwich time found by the methods just described may not be sufficiently exact. To correct it for such variation, or second difference, take the difference between the P. L. of Diff. used and the one which follows it in the Ephemeris, (or, more strictly, half the difference of the preceding and following ones). With this difference, and the first correction of the Greenwich time already found, enter Table I, appended to this volume, and take out the corresponding seconds, which are to be added to the approximate Greenwich time when the Prop. Logs. in the Ephemeris are decreasing; and subtracted when they are increasing.

Thus the Greenwich mean time of the observation can be obtained. If the observer has noted the time of observation by a chronometer, the difference of this chronometer-time and the Greenwich mean time will be the error of the chronometer on Greenwich time as found from the lunar distance. In this way lunar distances can be used as a check upon the chronometer. By a series of carefully observed lunar distances on both sides of the moon, the chronometer-error may generally be ascertained within 20 or 30 seconds.

If the observer has found the local mean time of observation from the observed altitude of one of the bodies, or by a watch regulated to that time by recent observations and corrected for change of longitude in the interval, the difference of this local time and the Greenwich time found from the lunar distance will be his longitude. A longitude derived by this method should always be considered as uncertain by 5' or more.

As an example of finding the Greenwich mean time from a lunar distance, suppose that in 1899, January 18, the corrected distance of the moon's centre from that of Fomalhaut is  $65^{\circ} 47'$ :—

Corrected distance	.	.	.	.	.	65	47	0		
Distance in Ephemeris Jan. 18, XV <sup>h</sup> .	.	.	.	.	.	65	38	25	P. L.	0.3276
Difference	.	.	.	.	.	0	8	35	P. L.	1.3216
									P. L.	0.9940
Time from XV <sup>h</sup> ( <i>after</i> )	.	.	.	.	.	+	0	18	15	
Corr. for 2d Diff., Table I	.	.	.	.	.	+		0		
Greenwich mean time Jan. 18	.	.	.	.	.		15	18	15	

By a table of common logarithms, or a table of logarithms of small arcs, the reduction of the Greenwich time would be found thus:—

From Ephemeris	P. L.	0.3276
Diff. of distances, $8' 35'' = 515''$	log	2.7118
Red. of Greenwich time, $1095^s = 0^m 18^s 15^s$	log	3.0394

The result is the same as by the previous method.

Pages 218—249 contain the geocentric ephemerides of the seven major planets. The positions are referred to the equator and true equinox of the date, and corrected for aberration; they are, therefore, apparent positions. All the data except meridian passage are given for the moment of Greenwich mean noon. The column *Meridian Passage* gives the hour, minute and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it has been observed for time, latitude or azimuth. The mode of reducing them to any instant of Greenwich mean time is the same as in the examples for the sun, previously given. The local mean time of passage across any other meridian can be found by dividing the daily differences by 24, and multiplying the quotient by the hours and fractions of the longitude of the place. The product is subtractive from the time of Greenwich passage when the place is east of Greenwich, and additive when west. The corrections can never exceed one-half the change for one day.

Pages 250—263 contain the heliocentric positions of the seven major planets, and the logarithms of their distances from the earth. The heliocentric longitude is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The daily motion is given for the moment of Greenwich mean noon. The column *Reduction to Orbit* gives the correction to be applied to the heliocentric longitudes in order to obtain the longitude counted along the orbit of the planet. This longitude is equal to the distance of the node from the mean equinox, plus the distance of the planet from the node. The heliocentric latitude is counted from the moving plane of the ecliptic. The *Logarithm of Radius Vector* is the logarithm of the distance of the centre of the planet from that of the sun, at each Greenwich mean noon given in the first column. The two last columns give, in the same way, the logarithm of the true distance of the centre of the planet from that of the earth. The one column gives the quantity for the Greenwich noon indicated on the left hand side of the page, and the other for the noon which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean noon of the day immediately following; in the case of Venus, Mars, Jupiter, and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 264—271 contain the rectangular co-ordinates of the centre of the sun, referred to the centre of the earth as the origin, and to the true equator and equinox of each date as the circle and point of reference. Each co-ordinate is given first for Greenwich mean noon, and in the column following for mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0* give the corrections to be applied to the co-ordinates for noon in order to obtain the corresponding co-ordinates referred to the mean equator and the mean equinox of January 0.

Pages 272—275 give the longitude and latitude of the moon for every Greenwich mean noon and midnight. Both quantities are referred to the true ecliptic and equinox of the date.

Pages 276 and 277 contain the position of the moon's equator and the mean longitude of the moon, and a table for computing the libration of the moon. The epochs of greatest libration of the moon, together with the formulæ for finding the libration in longitude and latitude are given on page 419.

Page 278 contains, for each tenth Greenwich mean noon, the values of the principal elements arising from the motion of the equinox, and also the aberration and parallax of the sun. The column *Apparent Obliquity of the Ecliptic* (HANSEN) gives the true inclination of the earth's equator to the ecliptic, without correction for the terms depending on the moon's longitude. The *Equation of Equinoxes* (HANSEN) is really the astronomical nutation; that given *In Longitude* is the correction to be applied to the longitude of the body referred to the mean equinox, in order to obtain that longitude as referred to the true equinox. When the correction is positive, the true longitudes are greater than those referred to the mean equinox; while the contrary is true when the correction has the negative sign. The equation *In R. A.* is equal to that in longitude, multiplied by the cosine of the obliquity of the ecliptic.

The next column gives the *Precession of Equinoxes in Longitude*, from January 0 to each of the dates following. *The Sun's Aberration* is the quantity which is to be applied to the true longitude of the sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. *The Sun's Equatorial Horizontal Parallax*, given in the next column, is the angle subtended by the radius of the earth's equator, as seen from the centre of the sun.

## PART II—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Page 280 contains the formulæ for reducing the positions of the fixed stars, using the notation of BESSEL, and the constants of PETERS and STRUVE. The formulæ by which the star-numbers are computed are also given.

Pages 281—284 contain the logarithms of the *Besselian Star Numbers*, *A, B, C, D*, for each Washington mean midnight. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D*; that is, *A* must be interchanged with *C*, and *B* with *D*. In the first column along with the solar day is given, for certain dates, the sidereal hour of Washington mean midnight. The sidereal time for which any set of quantities is given can be found by interpolation from these numbers.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:—

*Computation of the apparent place of  $\pi$  Aquarii for 1899, August 17, for the upper transit at Washington.*

	log <i>a</i>	0.4862	log <i>b</i>	6.9575	log <i>c</i>	8.7812	log <i>d</i>	8.4496 <i>n</i>
(Page 283)	log <i>A</i>	9.9975	log <i>B</i>	9.5761	log <i>C</i>	1.1868	log <i>D</i>	1.0687 <i>n</i>
	log <i>a'</i>	1.2595	log <i>b'</i>	9.6257	log <i>c'</i>	9.6435	log <i>d'</i>	8.1335
	log <i>A a</i>	0.4837	log <i>B b</i>	6.5336	log <i>C c</i>	9.9680	log <i>D d</i>	9.5183
	log <i>A a'</i>	1.2570	log <i>B b'</i>	9.2018	log <i>C c'</i>	0.8303	log <i>D d'</i>	9.2022 <i>n</i>

<i>Mean Place, 1899.0,</i>	$a_0 = 22^{\circ} 20' 7.159''$	$\delta_0 = 0^{\circ} 51' 53.27''$
	<i>A a</i> = + 3.046	<i>A a'</i> = + 18.07
	<i>B b</i> = 0.000	<i>B b'</i> = + 0.16
	<i>C c</i> = + 0.929	<i>C c'</i> = + 6.77
	<i>D d</i> = + 0.330	<i>D d'</i> = - 0.16
	<i>E</i> = + 0.003	$\tau \mu' = 0.00$
	$\tau \mu = 0.000$	

<i>Apparent Place, August 17,</i>	$a = 22^{\circ} 20' 11.467''$	$\delta = 0^{\circ} 52' 18.11''$
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Pages 285—292 contain the *Independent Star-Numbers*, which can be used for the same purpose. The column  $\tau$  gives the fraction of the year from the beginning of the fictitious year to each date. These quantities are connected with those of BESSEL by the relations given on page 280, where are also found the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, *a, b, c, d, a', b', c', d'*. The independent star-numbers are

given in order that the apparent place of the star may be determined when it is not convenient to compute these numbers.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:—

*Computation of the apparent place of  $\pi$  Aquarii for 1899, August 17, for the upper transit at Washington.*

$a_0 = 335^\circ 2'$		$\delta_0 = + 0^\circ 52'$			
$G = 1\ 5$		$G + a_0 = 336\ 7$			
$H = 127\ 22$		$H + a_0 = 102\ 24$			
$\log \frac{1}{r}$	8.8239	$\log \frac{1}{r}$	8.8239	$a_0 =$	$\begin{array}{r} h\ m\ s \\ 22\ 20\ 7.159 \end{array}$
$\log g$	1.2998	$\log h$	1.2862	$f =$	$\begin{array}{r} +\ 3.058 \\ -\ 0.008 \end{array}$
$\log \sin (G + a_0)$	9.6073 <i>n</i>	$\log \sin (H + a_0)$	9.9897	$(g) =$	$\begin{array}{r} -\ 0.008 \\ +\ 1.258 \end{array}$
$\log \tan \delta_0$	<u>8.1798</u>	$\log \sec \delta_0$	<u>0.0000</u>	$(h) =$	$\begin{array}{r} +\ 1.258 \\ \tau\ \mu = 0.000 \end{array}$
$\log (g)$	7.9108 <i>n</i>	$\log (h)$	0.0998	$\tau\ \mu =$	$\begin{array}{r} 0.000 \\ \hline 22\ 20\ 11.467 \end{array}$
		<i>Apparent R. A.,</i>	$a =$	$a =$	
$\log g$	1.2998	$\log h$	1.2862	$\delta_0 =$	$\begin{array}{r} 0^\circ\ 51'\ 53.27'' \\ +\ 18.24 \end{array}$
$\log \cos (G + a_0)$	<u>9.9611</u>	$\log \cos (H + a_0)$	9.3319 <i>n</i>	$(g') =$	$\begin{array}{r} +\ 18.24 \\ -\ 0.06 \end{array}$
$\log (g')$	1.2609	$\log \sin \delta_0$	<u>8.1797</u>	$(h') =$	$\begin{array}{r} -\ 0.06 \\ +\ 6.67 \end{array}$
		$\log (h')$	8.7978 <i>n</i>	$(i) =$	$\begin{array}{r} +\ 6.67 \\ \tau\ \mu' = 0.00 \end{array}$
				$\tau\ \mu' =$	$\begin{array}{r} 0.00 \\ \hline 0\ 52\ 18.12 \end{array}$
		<i>Apparent Dec.,</i>	$\delta =$	$\delta =$	
$\log i$	0.8240				
$\log \cos \delta_0$	<u>0.0000</u>				
$\log (i)$	0.8240				

Pages 293—301 contain the mean places of three hundred and eighty-three stars, for the beginning of the fictitious year 1899, or the moment when the sun's mean longitude is  $280^\circ$ .

The annual variations are to be considered as the differential coefficients of each co-ordinate with respect to the time at the beginning of the year.

In order that the list of mean places of stars may serve the purpose of a working-catalogue for the convenient use of astronomers, the position of each of the northern circumpolar stars is given in duplicate, one position being for the upper and the other for the lower culmination. The positions for the lower culmination are marked S. P. In this case, the right ascensions are the sidereal times at which the star crosses the lower meridian; and, in order to have the expressions for the co-ordinates congruous in all cases, the declinations are counted from the equator through the north pole, and therefore exceed  $90^\circ$ . The time of observation and the setting of the circle, in order to find a star on the meridian, are then obtained uniformly for all the stars.

Beginning with the volume of 1882, the number of stars has been greatly increased, in order to make the list more useful to field-astronomers. To show at a glance these additional stars, they are indicated in the list by an asterisk.

Pages 302—313 contain the apparent positions of the four north polar stars,  $\alpha$ ,  $\delta$  and  $\lambda$  Ursæ Minoris, and  $\gamma$  Cephei, for every upper transit at Washington. They include the terms depending on the moon's longitude. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26th is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 302, we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But, the lower transit following that of July 1st (page 308), does not take place until July 2.3. Hence, the lower transit of July 1st precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column of *Mean Solar Date*.

Pages 314—364 contain, for every tenth upper transit at Washington, the apparent places of those stars of the preceding list which are not marked with an asterisk. The mean solar

date in each left hand column gives the day and tenth of the transit; so that each intermediate transit may be readily identified. Along with each co-ordinate is given, in small type, the change for ten days. This quantity is to be regarded as the differential coefficient corresponding to the dates for which the star-places are given.

Pages 365—376 contain the apparent right ascensions of all stars marked with an asterisk in the list of mean places. The apparent right ascension of each star is given only for that part of the year when it may readily be observed on the meridian. In the case of circumpolar stars, the right ascensions for lower, as well as upper, transit are given.

Pages 377—384 contain the apparent right ascension, declination, and semidiameter of the sun, and the sidereal time, all for Washington mean noon. Adjoining columns give the seconds of right ascension and of declination for apparent noon, that is, for the moment of transit of the sun's centre over the meridian of Washington. The hours and minutes of right ascension, and the degrees and minutes of declination are the same for both mean and apparent noon. In case they would have differed, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that there is always a correspondence between the two numbers. The hourly motions in right ascension and declination are given for the moment of mean noon, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the sun's centre over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 385—392 contain the right ascension, declination, semidiameter, and parallax of the moon, at the moment of transit over the meridian of Washington. The mean time given in the second column is that of transit of the moon's centre over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the moment of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the moon in right ascension were uniform. By means of them, the position of the moon can be computed with astronomical accuracy at the moment of transit over any meridian not exceeding one hour in longitude from that of Washington, by taking account of second differences. With greater longitudes of the place, the accuracy of the result obtained in this way will diminish. The columns of sidereal time of semidiameter passing meridian, etc., do not seem to need any explanation, except that they all refer to the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When two opposite limbs are both so nearly full that they can be well observed, both are indicated.

Pages 393—409 contain the geocentric apparent right ascensions and declinations of the seven major planets, and their semidiameters and horizontal parallaxes, for the moments of all those transits over the meridian of Washington which can be observed.

### PART III—PHENOMENA.

This part gives the principal astronomical phenomena of the year, reduced to Washington mean time, except in the case of the eclipses and the data for the rings of Saturn, which are given in Greenwich mean time.

Pages 412—418 inclusive contain the elements necessary for computing the eclipses of the sun which occur during the year.



The eclipse-elements are given for the moment of conjunction of the sun and moon in right ascension. The subsequent tables and results are not, however, computed from these elements unchanged; but from the accurate positions of the two bodies as interpolated for each hour of the eclipse. The principal circumstances of each eclipse are as follows:—

On the line "Eclipse begins" is given the Greenwich mean time at which the earth first touches the moon's penumbra, and the longitude and latitude of the point of touching.

The "Central eclipse begins" when the axis of the moon's shadow first touches the earth, and the longitude and latitude of the point of touching follow.

"Central eclipse at noon" indicates the moment when the axis of the shadow is coincident with the plane of the meridian at the point of its intersection with the earth's surface. To the observer at this point the eclipse will be central at the moment of apparent noon.

"Central eclipse ends" and "Eclipse ends" have the converse meaning of the beginning.

*Maps of the Eclipses.*—The regions in which each eclipse is visible, are shown upon the maps given in connection with them. From these maps may also be derived the approximate determination of the times of beginning and ending, and of the magnitude of the eclipses at any place. The dotted curves show the outlines of the shadow for each hour of Greenwich mean time and therefore pass through all the places where the eclipse begins or ends at that hour. To find at what hour the eclipse begins at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between these two hours of Greenwich mean time: the fraction of the hour may be determined by dividing the hour proportionally to the space which it represents on the map. This division may be a little more exact by allowing for the changes in this space as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the time at which the eclipse of 1899, June 7, begins and ends at Hammerfest.

For the beginning we compare the distance of the place from the curves of 17<sup>h</sup> and 18<sup>h</sup> and we find it to correspond to about 12 minutes from the former, therefore the time of beginning is approximately 17<sup>h</sup> 12<sup>m</sup>; for the end we compare the distance of the place from the curves of 18<sup>h</sup> and 19<sup>h</sup> and find it to be about 45 minutes from the former, therefore the approximate time of end is 18<sup>h</sup> 45<sup>m</sup>, both of which are probably correct to within 2 or 3 minutes. Changing to local mean time the result will be:—

		<i>Beginning.</i>			<i>Ending.</i>		
		d	h	m	d	h	m
Greenwich mean time	June	7	17	12	7	18	45
Longitude east				1 35			1 35
Local mean time	June	7	18	47	7	20	20

In the case of total and annular eclipses, a rough estimate of the magnitude of the eclipse may be obtained from the position of the place relatively to the central line and to the limit. On the central line, the eclipse is annular or total, while on the limit, the limb of the moon only grazes that of the sun.

*More Accurate Computations.*—A more accurate determination of the phases as visible at any point of the earth's surface may be obtained from the Besselian elements which are given for every ten minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the centre of the earth, perpendicular to the right line joining the centres of the sun and moon. This latter line is the axis of the moon's shadow, and the plane is called the *fundamental plane*. We take the intersection of this plane with that of the earth's equator as the axis of *X*, and the centre of the earth as the origin of co-ordinates. The axis of *Y* is perpendicular to that of *X*, and directed toward the north; *x* and *y* are then the co-ordinates of the point in which the axis of the shadow intersects the fundamental plane. The angle *d*, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the

shadow is directed; this direction being that from the earth toward the moon and sun. The angle  $\mu$  is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities  $l$  and  $l'$  are the radii of the shadow-cones upon the fundamental plane,  $l$  corresponding to the penumbra, and  $l'$  to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which  $l'$  is regarded as positive for an annular, and negative for a total eclipse.

The angles  $f$  and  $f'$ , the tangents of which are given, are the angles which the elements of the respective shadow-cones make with the axis of the shadow; or, they are the semi-angles of the two cones.

At the bottom of the table are given the logarithms of the change of  $x$ ,  $y$  and  $\mu$ , in one minute, in order to facilitate the interpolation to any required moment.

The method of computing the eclipse from the given elements is as follows: It is premised that the moments of beginning and ending are those at which the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find such distance and radius we compute—

(1) The co-ordinates,  $\xi$ ,  $\eta$  and  $\zeta$ , of the observer, at some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase, together with their variations for one minute.

(2) The co-ordinates  $x$  and  $y$  of the axis of the shadow at the same moment, which, with their variations for one minute, are taken from the tables of elements.

(3) Hence, the position and motion of the observer relative to the axis of the shadow.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follow:—

(1) Find the geocentric co-ordinates of the station referred to the earth's equator, which are represented by  $\rho \cos \varphi'$  and  $\rho \sin \varphi'$ ,  $\rho$  being the distance from the centre of the earth, and  $\varphi'$  the geocentric latitude. These may be obtained from geodetic tables, or may be computed from the following table by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

$\varphi$  being, as usual, the geographic latitude.

Table for Computing the Geocentric Co-ordinates of a Place.

$\varphi$	Log F.	Log G.
0°	0.00000	0.00295
5	0.00001	0.00294
10	0.00004	0.00291
15	0.00010	0.00285
20	0.00017	0.00278
25	0.00026	0.00269
30	0.00037	0.00258
35	0.00048	0.00247
40	0.00061	0.00234
45	0.00074	0.00221
50	0.00086	0.00209
55	0.00099	0.00196
60	0.00111	0.00184
65	0.00121	0.00174
70	0.00130	0.00165
75	0.00138	0.00157
80	0.00143	0.00152
85	0.00146	0.00149
90	0.00147	0.00147

For the assumed Greenwich mean time of computation, take from the table of elements the values of  $\sin d$ ,  $\cos d$ , and  $\mu$ . Put:

$\lambda$ , the longitude west from Greenwich. The co-ordinates of the observer will then be:—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$

$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda)$$

$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda)$$

and their variations in one minute of mean time will be:—

$$\xi' = [7.63992] \rho \cos \varphi' \cos (\mu - \lambda)$$

$$\eta' = [7.63992] \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.63992] \xi \sin d$$

$\zeta'$  is not needed.

(2) The co-ordinates  $x$  and  $y$  of the axis of the shadow are taken from the tables of elements for the same assumed moment of Greenwich mean time, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. The variations for one minute are represented by  $x'$  and  $y'$ . Their logarithms are given at the foot of the tables.

(3) The distance  $m$  and position-angle  $M$  of the axis of the shadow relative to the observer, and the relative motions,  $n$  and  $N$ , are computed by the formulæ:—

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

(4) The radius  $L$  of the shadow or penumbra at the distance  $\zeta$  from the fundamental plane is computed by the formula

$$L = l - \zeta \tan f$$

$l$  and  $f$  being found in the table of elements, and  $\zeta$  computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or end of the eclipse, we shall have—

$$m = L$$

But, as this condition can scarcely ever be fulfilled on a first trial, a correction  $\tau$  to the assumed time is computed thus: Find the angle  $\psi$  from the equation,

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

There will be two values to this angle, of which one will be in the first and the other in the second quadrant when  $\sin \psi$  is positive, and one in the third and the other in the fourth when  $\sin \psi$  is negative. But, simplicity will be gained by taking only that value of  $\psi$  for which  $\cos \psi$  is positive. This value lies between the limits  $+90^\circ$  and  $-90^\circ$ . The correction  $\tau$  to the assumed time will be found in minutes, from—

For beginning:

$$\tau = - \frac{m \cos (M - N)}{n} - \frac{L \cos \psi}{n}$$

For ending:

$$\tau = - \frac{m \cos (M - N)}{n} + \frac{L \cos \psi}{n}$$

One such pair of values of  $\tau$  cannot, however, give the times of both beginning and ending with accuracy. To attain accuracy we must, in commencing the computation, assume two times, one near that of beginning, and another near that of ending. These approximate times may be derived from the chart of the eclipse. The computation for the first assumed time will give a small value of  $\tau$  which, applied to the assumed time, will give a nearly correct time for the beginning of the eclipse, and a large value which, added to the assumed time, will give an inaccurate time of ending. The computation for the second assumed time will give a small and nearly correct value of  $\tau$ , to be applied to the assumed time for the end, and a large negative and inaccurate one to be subtracted for the beginning. We shall thus deduce two times of each phase, only one of which is to be considered approximately correct.

The more accurate times of beginning and ending may now be taken in place of the first assumed ones, and the computation may be repeated from the beginning, leading to a pair of values of  $\tau$ , which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors. The following theorem will, however, enable us to obtain a second approximation to the true times of each phase without repeating the computation.

**THEOREM.**—*The error of each result is approximately proportional to the square of the correction  $\tau$ , multiplied by the sine of the sun's hour-angle,  $(\mu-\lambda)$ , for the middle of the interval between the time of computation and that of the phase.*

To apply this theorem we find the two values of  $\tau^2 \sin (\mu-\lambda)$  corresponding to the required phase. We then find the ratio of these quantities—which will commonly be a large number, and divide the difference of the results by this ratio. The quotient will be a correction to be applied to the more accurate result in such a way as to make it deviate yet more from the less accurate one. This correction should be positive in the local forenoon, and negative in the afternoon, and its value should never materially exceed  $0^m.001 \tau^2$ .

Unless the times chosen for computation are unusually in error, say ten minutes or more, the corrected results thus obtained will be theoretically correct within less than a second. But to guard against numerical errors it is better, after making this final correction, to repeat the computations so far as to obtain new values of  $m$  and  $L$  for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, further corrections and computations may be made by the computer according to his own judgment.

It may be remarked that the uncertainty of the ephemerides is such that a prediction may be several seconds in error from this unavoidable cause alone.

**Position-angle of Point of Contact.**—The position-angle  $P$ , of the point of contact, reckoned from the north point of the sun's limb toward the east, is found by the formula

$$\text{For beginning:} \quad P = N - \psi \pm 180^\circ$$

$$\text{For end:} \quad P = N + \psi$$

it being assumed that, in each case, the value of  $\psi$  is taken between the limits  $\pm 90^\circ$ .

Computation of the Solar Eclipse of 1899, January 11, for Sitka, Alaska, whose position is—

$$\begin{aligned} \text{Latitude, } \varphi &= + 57^\circ 3' \\ \text{Longitude, } \lambda &= + 135^\circ 20' \end{aligned}$$

Constants for the given place:—

$$\rho \sin \varphi' = 9.92193$$

$$\rho \cos \varphi' = 9.73656$$

From the Eclipse Charts we find the approximate times of the phases to be—

$$\begin{array}{lcl} \text{Beginning January } 11^d 10^h 35^m & \left. \vphantom{\begin{array}{l} \text{Beginning} \\ \text{Ending} \end{array}} \right\} & \text{Greenwich Mean Time.} \\ \text{Ending } 11^d 12^h 20^m & & \end{array}$$

Greenwich Mean Time,	January	Beginning.			Ending,		
		11 <sup>d</sup>	10 <sup>h</sup>	35 <sup>m</sup>	12 <sup>h</sup>	20 <sup>m</sup>	
		° ' "			° ' "		
	$\mu$	156	39	54	182	54	36
	$\lambda$	135	20	0	135	20	0
	$\mu-\lambda$	21	19	54	47	34	36
	$\rho \cos \varphi'$	9.73656			9.73656		
	$\sin (\mu-\lambda)$	9.56082			9.86816		
	$\log \xi$	9.29738			9.60472		
	$\xi$	+			+		
		0.19833			0.40245		

Greenwich Mean Time,	January	Beginning. 11 <sup>d</sup> 10 <sup>h</sup> 35 <sup>m</sup>	Ending. 12 <sup>h</sup> 20 <sup>m</sup>
	$\rho \sin \varphi'$	9.92193	9.92193
	$\cos d$	9.96799	9.96803
		9.88992	9.88996
	(1)	+ 0.77610	+ 0.77620
	$\rho \cos \varphi'$	9.73656	9.73656
	$\sin d$	9.56844 <i>n</i>	9.56823 <i>n</i>
	$\cos (\mu - \lambda)$	9.96917	9.82905
		9.27417 <i>n</i>	9.13384 <i>n</i>
	(2)	- 0.18800	- 0.13609
(1)-(2)	$\eta$	+ 0.96410	+ 0.91229
	$\rho \sin \varphi' \sin d$	9.49037 <i>n</i>	9.49016 <i>n</i>
	(3)	- 0.30929	- 0.30914
	$\rho \cos \varphi' \cos d \cos (\mu - \lambda)$	9.67372	9.53364
	(4)	+ 0.47176	+ 0.34170
(3)+(4)	$\zeta$	+ 0.16247	+ 0.03256
	const. log	7.63992	7.63992
	$\rho \cos \varphi' \cos (\mu - \lambda)$	9.70573	9.56561
	$\log \xi'$	7.34565	7.20553
	$\xi'$	+ 0.002216	+ 0.001605
	const. log	7.63992	7.63992
	$\xi \sin d$	8.86582 <i>n</i>	9.17295 <i>n</i>
	$\log \eta'$	6.50574 <i>n</i>	6.81287 <i>n</i>
	$\eta'$	- 0.000320	- 0.000650
	$x - \xi$	- 0.51779	+ 0.26486
	$y - \eta$	+ 0.14738	+ 0.45598
	$x' - \xi'$	+ 0.007183	+ 0.007792
	$y' - \eta'$	+ 0.002763	+ 0.003098
	$m \sin M$	9.71415 <i>n</i>	9.42302
	$m \cos M$	9.16844	9.65894
	$\tan M$	0.54571 <i>n</i>	9.76408
	$M$	285° 53' 17"	30° 9' 4"
	$\sin M$	9.98308 <i>n</i>	9.70095
	$\log m$	9.73107	9.72207
	$n \sin N$	7.85631	7.89165
	$n \cos N$	7.44138	7.49108
	$\tan N$	0.41493	0.40057
	$N$	68° 57' 38"	68° 19' 5"
	$\sin N$	9.97003	9.96813
	$\log n$	7.88628	7.92352
	$\tan f$	7.67709	7.67709
	$\log \zeta$	9.21078	8.51268
		6.88787	6.18977
	$\zeta \tan f$	+ 0.00077	+ 0.00015
	$l$	+ 0.53819	+ 0.53814
	$L$	+ 0.53742	+ 0.53799

Greenwich Mean Time,	January	Beginning. 11 <sup>d</sup> 10 <sup>h</sup> 35 <sup>m</sup>	Ending. 12 <sup>h</sup> 20 <sup>m</sup>
$M - N$		216° 55' 39"	321° 49' 59"
$\sin (M - N)$		9.77873 <i>n</i>	9.79095 <i>n</i>
$\log m$		9.73107	9.72207
$\text{colog } L$		0.26968	0.26923
$\sin \psi$		9.77948 <i>n</i>	9.78225 <i>n</i>
$\psi$		— 37° 0' 7"	— 37° 16' 42"
$\log \frac{m}{n}$		1.84479	1.79855
$\cos (M - N)$		9.90276 <i>n</i>	9.89554
		1.74755 <i>n</i>	1.69409
$-\frac{m}{n} \cos (M - N)$		+ 55.918	— 49.441
$\log L$		9.73032	9.73077
$\cos \psi$		9.90234	9.90075
$\text{colog } n$		2.11372	2.07648
		1.74638	1.70800
$\frac{L \cos \psi}{n}$		— 55.768	+ 51.050
$\tau$		+ 0.150 <sup>m</sup>	+ 1.609 <sup>m</sup>
$T$		10 35 <sup>h m</sup>	12 20 <sup>h m</sup>
$t$		10 35.150	12 21.609
$\lambda$		+ 9 1.333	+ 9 1.333
Local Mean Time,	January	11 1 33.817 <sup>d h m</sup>	3 20.276 <sup>h m</sup>

No correction is necessary since the assumed times differ very little from the computed ones.

Therefore we have

Beginning of the eclipse,	January	11 1 33 49.0 <sup>d h m s</sup>	} Local Mean Time.
End of the eclipse,	"	11 3 20 16.6	

Angle of position:

	Beginning.	Ending.
$N$	68° 57.6'	68° 19.1'
$\psi (+ 180^\circ)$	217 0.1	— 37 16.7
$P$	85 57.7	31 2.4

from the north point of the sun's disk towards the east for direct image.

*The Mean Places of Stars Occulted During the Year.*—Pages 420—423 contain the mean places for 1899.0 of stars (other than those given on pages 293—301) occulted by the moon in 1899, with their annual proper motions.

*Elements of Occultations.*—Pages 424—455 give the elements for the prediction of the times of occultation of stars and planets by the moon. In the columns referring to the star, those headed *Red'ns* from 1899.0 give the quantities necessary to reduce the mean place of the star at the beginning of 1899 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

The quantities in the following five columns are all given for the moment of geocentric conjunction of the star and moon in right ascension. Let there be a line passing from the star through the centre of the moon, and let a plane perpendicular to this line pass through the centre of the earth: this plane will be the fundamental plane for the occultation. The system of co-ordinates is similar to that already described for eclipses. The cone circumscribing the moon and star may be regarded as a cylinder having everywhere the same diameter as the moon. This cylinder will intercept the fundamental plane in a circle of which the linear diameter will be the same as that of the moon.

The *Washington Mean Time* is the moment at which the two bodies are in geocentric conjunction in right ascension. At this moment the co-ordinate  $x$  of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour-Angle*  $H$  gives the common geocentric hour-angle of the moon and star at the same moment, counted from the meridian of Washington—positive toward the west and negative toward the east. Column  $Y$  gives the co-ordinate  $y$  of the axis of the cylinder upon the fundamental plane at the same moment. Columns  $x'$  and  $y'$  give the hourly variation of  $x$  and  $y$ . The linear unit in these columns is the earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star behind the limb of the moon may be computed for any part of the earth by a method nearly the same as that already explained for computing eclipses, only more simple.

We shall first show how to compute an isolated occultation for a particular place, assuming it to be visible at that place, and then show how all the occultations which will be visible at a place may be selected and computed by a more rapid process.

(1) The geocentric co-ordinates of the place,  $\rho \sin \phi'$  and  $\rho \cos \phi'$ , are to be computed by the formulæ and table given in connection with eclipses on page 513.

As in the case of eclipses, it is necessary to have an approximate time of the phenomenon, corresponding to that obtained from the charts of the eclipses. The quantity  $H$  being the Washington west hour-angle of the two bodies at the moment of geocentric conjunction,  $H - \lambda$  will be the local hour-angle of the star at this same moment. Let us call this angle  $h_0$ , putting

$$h_0 = H - \lambda$$

where  $\lambda$  is the longitude west of *Washington*.

The next step will then be to find the approximate moment of apparent conjunction in right ascension as seen from the place. An approximate correction to reduce the time and hour-angle for geocentric conjunction to those for apparent conjunction may be taken from Mr. DOWNES's table, on pages 458—459. This correction will have the same sign as  $h_0$ .

When this table is not available, the correction may be computed thus: Compute the quantities  $\xi_0$ ,  $\xi'$  and  $\tau$  from the formulæ,

$$\begin{aligned}\xi_0 &= \rho \cos \phi' \sin h_0 \\ \xi' &= [9.4192] \cos (h_0 + \frac{1}{3} h_0) \\ \tau &= \frac{\xi_0}{x' - \xi'}\end{aligned}$$

$\tau$  will then be the approximate interval between the times of geocentric and local conjunction. By applying it to the Washington mean time of the former, as given with the elements, we shall have the Washington mean time of the latter within a few minutes.

The average duration of an occultation is about an hour. Thence, by adding  $0^h.5$  to and subtracting it from the mean time of apparent conjunction, we shall have approximate times of the phases of immersion and emersion for farther computation. Let us then put,

$$\tau_1 = \tau - 0^h.5$$

$$\tau_2 = \tau + 0^h.5$$

$T$ , the Washington mean time of geocentric conjunction in R. A.

$d$ , the declination of the star.

(2) Compute for the moments  $T + \tau_1$  and  $T + \tau_2$  the following quantities, in which we write  $\tau$  for each of the quantities  $\tau_1$  and  $\tau_2$ . The latter, when used as angles, are to be changed to arc by multiplying by 15, and the minutes are to be further increased by one-sixth the number of degrees in order to reduce to the sidereal hour-angle.

$$\xi = \rho \cos \varphi' \sin (h_0 + \tau)$$

$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (h_0 + \tau)$$

$$\xi' = [9.41916] \rho \cos \varphi' \cos (h_0 + \tau)$$

$$\eta' = [9.41916] \rho \cos \varphi' \sin d \sin (h_0 + \tau) = [9.41916] \xi \sin d$$

$$x = x' \tau$$

$$y = Y + y' \tau$$

Compute  $m$ ,  $M$ ,  $n$  and  $N$  from the equations

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

$$n' = \frac{n}{60} = [8.22185] n$$

$$\sin \psi = [0.56500] m \sin (M - N)$$

Then,  $t_1$  and  $t_2$  from the equations

$$t_1 = -\frac{m}{n'} \cos (M - N) - \frac{[9.43500]}{n'} \cos \psi \quad (\text{Beginning.})$$

$$t_2 = -\frac{m}{n'} \cos (M - N) + \frac{[9.43500]}{n'} \cos \psi \quad (\text{End.})$$

The quantities  $t_1$  and  $t_2$  will then be the corrections in minutes to be applied to the respective times  $T + \tau_1$  and  $T + \tau_2$  to obtain the Washington mean times of the phases.

As in the case of eclipses, the small value of  $t_1$  will give an accurate result for one phase, and the large value an inaccurate result for the other. Both accurate results may then be corrected by comparison with the inaccurate one, in the way described for eclipses, and a result obtained which will probably be correct within a fraction of a minute of time.

As a check upon the result, it will be advisable to compute  $\xi$ ,  $\eta$ ,  $x$  and  $y$  for the moments finally obtained. If the times are correct these quantities will fulfil the condition,

$$\sqrt{(x - \xi)^2 + (y - \eta)^2} = 0.27227$$

If  $\log m \sin (M - N) = 9.43500$  nearly, a recauculation will generally be necessary to determine whether, numerically,  $\sin \psi < 1$ , or  $\sin \psi > 1$ . In the latter case, the impossible value of  $\sin \psi$  indicates that an occultation at the given place is impossible, unless the computed distance from the moon's limb is within the errors of the ephemerides of the moon and star.

In such cases of near approach to the moon's limb, we may take  $\psi = 90^\circ$ , or  $270^\circ$ , according as  $\sin (M - N)$  is positive or negative; and for finding the time of nearest approach,

$$t = -\frac{m \cos (M - N)}{n'}$$



Putting  $\pi$  for the moon's horizontal parallax, the distance from the moon's limb will be,

$$\pi [m \sin (M - N) - 0.27227]$$

disregarding the sign of  $\sin (M - N)$ ; or, allowing for the augmentation of the semidiameter,

$$\pi [m \sin (M - N) - 0.27227] [1 + z \sin \pi]$$

where

$$z = \rho \cos \varphi' \cos d \cos (h_0 + \tau) + \rho \sin \varphi' \sin d$$

The position-angle  $P$ , of the line from the moon's centre to the star at the times of contact, reckoned from the north point toward the east, is given by the formulæ:—

$$P = N - \psi \quad \text{for immersion,}$$

$$P = N + \psi \pm 180^\circ \quad \text{for emersion,}$$

it being supposed that the value of  $\psi$ , in each case, is taken between the limits  $\pm 90^\circ$ .

To find the angle from the vertex, we compute the angle  $C$  from the formula,

$$\tan C = \frac{\xi + t \xi'}{\eta + t \eta'}$$

in which the value of  $t$  corresponding to the phase is to be used. Then

$$V = P - C$$

is the angle from the vertex, also reckoned from the north toward the east.

As an example of an isolated occultation, we will compute that of  $\sigma$  Leonis, on January 27, 1899, for Cincinnati, whose position is

$$\varphi = + 39^\circ 8' 19''.5$$

$$\lambda = + 0^h 29^m 29^s.2$$

Constants for the given place,

$$\rho \sin \varphi' = 9.79781$$

$$\rho \cos \varphi' = 9.89024$$

From the elements on page 424, we have

$$H = - 2^h 7.3^m$$

$$h_0 = H - \lambda = - 2^h 36.787^m$$

From DOWNES's Table, pages 458 and 459, or from the formulæ on page 518, we find the correction to the Washington mean time of geocentric conjunction to be about  $- 1^h 20^m$ , therefore the Washington mean time of apparent conjunction at the given place is January 27<sup>d</sup> 9<sup>h</sup> 39<sup>m</sup>.7; subtracting and adding 30<sup>m</sup>, we shall have the approximate Washington mean times of immersion and emersion to be used in the computation, thus:

$$\begin{aligned} \tau_1 &= - 1^h 50^m \\ \tau_2 &= - 0^h 50^m \end{aligned}$$

$$\begin{aligned} T + \tau_1 &= \text{January } 27^d 9^h 9.7^m \\ T + \tau_2 &= \text{ " } 27^d 10^h 9.7^m \end{aligned}$$

		Immersion.			Emersion.		
		d	h	m	h	m	
Washington Mean Time,	January	27	9	9.7	10	9.7	
	$h_0$	—	2	36.787	—	2	36.787
	$\tau$ (in sidereal time)	—	1	50.301	—	0	50.137
	$h_0 + \tau$ (in arc)	—	66°	46' 19"	—	51°	43' 52"
	$\rho \cos \varphi'$			9.89024			9.89024
	$\sin (h_0 + \tau)$			9.96329 <i>n</i>			9.89494 <i>n</i>
	$\log \xi$			9.85353 <i>n</i>			8.78518 <i>n</i>
	$\xi$	—		0.71371	—		0.60979

Washington Mean Time,	January	Immersion. 27 <sup>d</sup> 9 <sup>h</sup> 9 <sup>m</sup> .7	Emersion. 10 <sup>h</sup> 9 <sup>m</sup> .7
$\rho \sin \varphi'$		9.79781	9.79781
$\cos d$		9.99288	9.99288
		9.79069	9.79069
(1)	+	0.61757	+ 0.61757
$\rho \cos \varphi'$		9.89024	9.89024
$\sin d$		9.25438	9.25438
$\cos (h_0 + \tau)$		9.56593	9.79194
		8.71055	8.93656
(2)	+	0.05135	+ 0.08641
(1)-(2) $\eta$	+	0.56622	+ 0.53116
const. log		9.41916	9.41916
$\rho \cos \varphi' \cos (h_0 + \tau)$		9.45617	9.68218
$\log \xi'$		8.87533	9.10134
$\xi'$	+	0.07505	+ 0.12628
const. log		9.41916	9.41916
$\xi \sin d$		9.10791 <i>n</i>	9.03956 <i>n</i>
$\log \eta'$		8.52707 <i>n</i>	8.45872 <i>n</i>
$\eta'$	-	0.03366	- 0.02876
$\log x'$		9.70655	9.70655
$\log \tau$		0.26324 <i>n</i>	9.92082 <i>n</i>
$\log x$		9.96979 <i>n</i>	9.62737 <i>n</i>
$x$	-	0.93280	- 0.42400
$\log y'$		9.32449 <i>n</i>	9.32449 <i>n</i>
$\log y' \tau$		9.58773	9.24531
$y' \tau$	+	0.38702	+ 0.17592
$Y$	+	0.12540	+ 0.12540
$y$	+	0.51242	+ 0.30132
$x - \xi$	-	0.21909	+ 0.18579
$y - \eta$	-	0.05380	- 0.22984
$x' - \xi'$	+	0.43375	+ 0.38252
$y' - \eta'$	-	0.17744	- 0.18234
$m \sin M$		9.34062 <i>n</i>	9.26903
$m \cos M$		8.73078 <i>n</i>	9.36143 <i>n</i>
$\tan M$		0.60984	9.90760 <i>n</i>
$M$	256° 12' 12"		141° 2' 58"
$\sin M$		9.98729 <i>n</i>	9.79841
$\log m$		9.35333	9.47062
$n \sin N$		9.63724	9.58265
$n \cos N$		9.24905 <i>n</i>	9.26088 <i>n</i>
$\tan N$		0.38819 <i>n</i>	0.32177 <i>n</i>
$N$	112° 14' 55"		115° 29' 11"
$\sin N$		9.96640	9.95554
$\log n$		9.67084	9.62711
colog 60		8.22185	8.22185
$\log n'$		7.89269	7.84896

		Immersion.		Emersion.	
Washington Mean Time,	January	27 <sup>d</sup>	9 <sup>h</sup> 9 <sup>m</sup> .7	10 <sup>h</sup> 9 <sup>m</sup> .7	
	const. log		0.56500	0.56500	
	log $m$		9.35333	9.47062	
	$\sin (M - N)$		9.76969	9.63498	
	$\sin \phi$		9.68802	9.67060	
	$\phi$		29° 10' 47"	27° 55' 45"	
	$\log \frac{m}{n'}$		1.46064	1.62166	
	$\cos (M - N)$		9.90771 $n$	9.95526	
			1.36835 $n$	1.57692	
	$-\frac{m}{n'} \cos (M - N)$	+	23.353	- 37.750	
	const. log		9.43500	9.43500	
	colog $n'$		2.10731	2.15104	
	$\cos \phi$		9.94107	9.94622	
			1.48338	1.53226	
	$\frac{[9.43500] \cos \phi}{n'}$	-	30.436	+ 34.062	
	$t$	-	7.083	- 3.688	
	$Z$	<sup>d</sup>	<sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup>	
	January 27	9	9.700	10	9.700
	January 27	9	2.617	10	6.012
	$\lambda$	0	29.487	0	29.487
Cincinnati Mean Time,	January 27	8	33.130	9	36.525
Angle of position:					
	$N$		112 14.9	115 29.2	
	$\phi (+180^\circ)$		29 10.8	27 55.8	
	$P$		83 4.1	323 25.0	

from the north point of the moon's limb toward the east for direct image.

*Prediction of Many Occultations for a Given Place.*—When it is desired to predict all the occultations which will be visible at some one place, tables may be constructed and applied in such a way as to greatly diminish the labor of computation. In using such tables, the most convenient course will be to find for each occultation the hour-angle of the star at the moment of apparent conjunction in right ascension, as seen from the place of observation. The table of elements, pages 424—455, gives  $H$ , the Washington hour-angle at the moment of geocentric conjunction. The corresponding geocentric hour-angle at the place will be

$$h_0 = H - \lambda \quad (\lambda = \text{west longitude from Washington}).$$

The moment of apparent conjunction, as seen from the station, will be given by the condition  $\xi = x$ ; or, using the values of  $\xi$  and  $x$ ,

$$\rho \cos \phi' \sin h = x' \tau$$

$h$  being the west hour-angle of the star at the moment in question, and  $\tau$  the interval, in hours of mean time, which has elapsed since geocentric conjunction. We shall therefore have,

$$h = h_0 + \tau$$

for the hour-angle at the end of the interval  $\tau$  after geocentric conjunction. In strictness,  $\tau$  should here be multiplied by the factor  $1 + \frac{1}{365.25}$ , because the star moves a little more than  $15^\circ$  in an hour of mean time; but the error arising from the neglect of the factor is too small to be important, as it will affect the predicted time of conjunction by less than 10 seconds. The equation for finding  $\tau$  is therefore,

$$\rho \cos \varphi' \sin (h_0 + \tau) = x' \tau$$

The quantities  $h_0$  and  $x'$  being derived immediately from the data of the Ephemeris, the quantity  $\tau$  is readily obtained by successive approximation, and may be tabulated as a function of  $h_0$  and  $x'$ . The computation of  $\tau$  is effected as follows. We have

$$\sin (h_0 + \tau) = \sin h_0 + 2 \sin \frac{1}{2} \tau \cos (h_0 + \frac{1}{2} \tau) \quad (1)$$

The value of  $\tau$  in arc being seldom more than  $24^\circ$  we may put  $\tau$  itself for  $2 \sin \frac{1}{2} \tau$ . The equation will then become

$$\rho \cos \varphi' \sin h_0 + \tau \rho \cos \varphi' \cos (h_0 + \frac{1}{2} \tau) = x' \tau$$

from which we find

$$\tau = \frac{\rho \cos \varphi' \sin h_0}{x' - \rho \cos \varphi' \cos (h_0 + \frac{1}{2} \tau)} \quad (2)$$

To tabulate  $\tau$ , we must first have a table of the quantities

$$\begin{aligned} \xi &= \rho \cos \varphi' \sin h \\ \xi' &= [9.41916] \rho \cos \varphi' \cos h \end{aligned} \quad (3)$$

which table may be formed for every 10 minutes (in time) of  $h$ . If we then put  $\xi_0$  for the value of  $\xi$  corresponding to  $h = h_0$  and  $\xi'_1$  for the value of  $\xi'$  corresponding to  $h = h_0 + \frac{1}{2} \tau$ , we shall have

$$\tau = \frac{\xi_0}{x' - \xi'_1} \quad (4)$$

Since we must know the value of  $\tau$ , approximately, before we can take  $\xi'_1$  from the table, this equation can be solved only by successive approximations. The approximations converge so rapidly as to offer no difficulty. It will be best to begin by comparing values of  $\tau$  for the two extremes of  $x'$ , namely,  $x' = 0.48$  and  $x' = 0.60$ , because the approximate values of  $\tau$  can then be interpolated for all the intermediate values of  $x'$ . For the first approximation may be taken—

$$\begin{aligned} \frac{1}{2} \tau &= 50^m \sin \frac{4}{3} h_0 \quad (\text{for } x' = 0.48) \\ \frac{1}{2} \tau &= 40^m \sin \frac{4}{3} h_0 \quad (\text{for } x' = 0.60) \end{aligned} \quad (5)$$

or, the approximate values of  $\tau$  may be taken from Mr. DOWNES's table, pages 458—459. It will be best to make the computation for every  $30^m$  of  $h_0$ , and to find the intermediate values of  $\tau$  for every  $10^m$  by interpolation. Then for each  $30^m$  of  $h_0$  we take  $\xi'$  from a table with the argument  $h_0 + \frac{1}{2} \tau$ , and  $\log \xi$  with the argument  $h_0$ , and thence compute  $\tau$  by (4). If the value of  $\tau$  thus arrived at differs more than  $3^m$  from that employed in taking out  $\xi'$ , a new value may be used to correct  $\xi'$ , and the computation may be repeated. The values corresponding to  $x' = 0.51$ ,  $x' = 0.54$ , and  $x' = 0.57$ , can then be computed with the single interpolation of approximate values of  $\tau$ , and afterward the table can be extended by interpolation to every  $0.01$  of  $x'$  between  $x' = 0.48$  and  $x' = 0.60$ . It will be best to compute  $\tau$  in the first place to every  $0.001$  of an hour, and to drop the last figure in forming the definitive table. The table thus formed will be called *Table I*.

The values of  $\eta$  and  $\eta'$  may then be tabulated for every degree of the star's declination, and every  $10^m$  of  $h$ . It is a mere question of convenience whether to compute the table for negative values of  $d$ , since by putting

$$\begin{aligned}\eta_1 &= \rho \sin \varphi' \cos a \\ \eta_2 &= -\rho \cos \varphi' \sin d \cos h\end{aligned}$$

$\eta_1$  may be given in a table of single-entry; and taking  $\eta_2$  from the table of double-entry for a positive  $d$ , we shall have

$$\eta = \eta_1 \pm \eta_2$$

the lower sign being used for a negative  $d$ . But the extension of the table for  $\eta$  to negative values of  $d$  is so readily made that it will probably be found better to do it, so as to save taking out  $\eta_1$  and  $\eta_2$  separately.

This table for  $\eta$  will be called *Table II*, and the corresponding one for  $\eta'$  with the same arguments *Table III*. The precepts for using the tables will then be as follow:—

From Table I with the arguments  $x'$  and  $H - \lambda = h_0$  take out the value of  $\tau$ . It will be sufficient to use the nearest 0.01 of  $x'$ .  $\tau$  will be of the same sign as  $h_0$ . Then, enter Table II with the arguments  $d$  (the star's declination) and  $h = h_0 + \tau$ , and take out the value of  $\eta$ . Form the quantities  $y = Y + y' \tau$ , and  $y - \eta$ . If the latter quantity lies between the limits  $\pm 0.28$ , it is almost certain that there will be an occultation. If it falls without the limits  $\pm 0.33$ , it is almost certain that there will not be an occultation. A convenient rule to adopt will be—

$$\begin{aligned}y' < 0.10, \text{ limits} &= \pm 0.29 \\ 0.10 < y' < 0.15, \text{ limits} &= \pm 0.30 \\ 0.15 < y' < 0.20, \text{ limits} &= \pm 0.31 \\ 0.20 < y' \quad \quad \quad \text{limits} &= \pm 0.33\end{aligned}$$

Here, only the absolute value of  $y'$  is to be considered, without respect to its algebraic sign.

If  $y - \eta$  falls between the limits thus indicated, take the values of  $\xi'$  and  $\eta'$  from the appropriate tables and compute  $v$ ,  $Q$  and  $\Delta$  from the equations

$$\begin{aligned}v \sin Q &= y' - \eta' \\ v \cos Q &= x' - \xi' \\ \Delta &= (y - \eta) \cos Q\end{aligned}$$

If  $\Delta > 0.2723$  or  $\log \Delta > 9.4350$  there will be no occultation, though the moon may graze the star when  $\Delta = 0.2723$  is very small. If  $\Delta < 0.2723$ , compute

$$\begin{aligned}\tau_1 &= -\frac{y - \eta}{v} \sin Q & \cos P &= \frac{\Delta}{0.2723} \quad (P < 180^\circ) \\ \tau_2 &= \frac{0.2723 \sin P}{v}\end{aligned}$$

We shall then have—

$$\text{Local mean time of immersion, } T - \lambda + \tau + \tau_1 - \tau_2$$

$$\text{Local mean time of emersion, } T - \lambda + \tau + \tau_1 + \tau_2$$

$$\text{Position-angle from north toward east at immersion, } 180^\circ - Q - P$$

$$\text{Position-angle from north toward east at emersion, } 180^\circ - Q + P$$

In predicting the occultations for a given place, the first operation will be to go over the list of occultations in the Ephemeris, and select those which may be visible. The conditions of possible visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.

2. The quantity  $H - \lambda$ , taken without regard to sign, must be less than the semi-diurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east horizon, or an immersion in the west, when this difference is a few minutes less than an hour.

3. The sun must not be much more than an hour above the horizon at the local mean time  $T - \lambda$ , unless the star is bright enough to be seen in the day time.

The most convenient course will be to write the value of  $-\lambda$  on the bottom of a sheet of paper, and passing through the list of occultations, pause over each one for which condition (1) is fulfilled, and examine whether conditions (2) and (3) are fulfilled. If either fails, the computer passes on. Very often it will require some examination to find whether  $H - \lambda$  or  $T - \lambda$  falls within the limits; in these cases, the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

*Phenomena of Planets and Satellites*, pages 460—493.—These are, for the most part, sufficiently explained in the body of the work. The following additional explanations are added for completeness :—

*Disks of Mercury and Venus*, pages 460—461.—The angle  $\theta$ , needed in reducing meridian observations, is the angle which the arc of the great circle from the planet to the sun, makes with the arc from the planet toward the west, reckoned in the direction west, north, east, south. This position-angle is reckoned from  $0^\circ$  to  $360^\circ$ , as in the measurement of double stars, the planet taking the place of the central star. But its measure is  $90^\circ$  greater than that of a double star.

We may also regard  $\theta$  as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

*Satellites and Disk of Mars*, page 462.—This page gives the Washington mean time of the greatest eastern and western elongations, the position angles and the distance of the satellites from the centre of the planet, for elongations visible at Washington and the apparent disk of the planet for every thirtieth day throughout the year.

*Satellites of Jupiter*, pages 463—487.—The times of phenomena are explained at the foot of each page; the diagram is on page 463.

*Phenomena*, pages 494—495.—The conjunctions, quadratures, and oppositions of the planets with respect to the sun, give the hours when the longitude of each planet differs from that of the sun by  $0^\circ$ ,  $90^\circ$ , or  $180^\circ$ .

The conjunctions of the moon and planets with each other are given in right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

*Latitude by Observed Altitude of Polaris*.—Table IV replaces the Tables A, B, C, D, given as a *Supplement* to the volumes of the Ephemeris for 1874—1881, and is intended for use at sea and reconnaissance on land. It will furnish an approximate value of the latitude, the probable error of which, in so far as the table is concerned, will be a few tenths of a minute of arc.

The directions for using the table are adapted to a right ascension of Polaris equal to  $1^h 22^m.0$ . Somewhat greater accuracy may be insured by substituting the right ascension of Polaris at the date of observation, from pages 302—313 of this volume.



# APPENDIX.

## ON THE CONSTRUCTION OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR 1899.

IN the formulæ and numbers relating to the fixed stars, pages 280—292, the adopted constants of precession and aberration are those of STRUVE, and the nutation is that of PETERS, namely:

$$\text{Precession} = 50''.2411 + 0''.0002268 \, t$$

$$\text{Nutation} = 9''.2231 + 0''.000009 \, t$$

$$\text{Aberration} = 20''.4451$$

in which  $t$  is the number of years after 1800. These quantities have been used in all computations relating to the fixed stars.

The obliquity and nutation given on page 278 are derived from HANSEN's *Tables du Soleil*. These numbers have been used in all the ephemerides of the sun, moon and planets.

HANSEN's obliquity of the ecliptic is  $0''.27$  greater than that of PETERS given in the issues of this Ephemeris before 1882.

A comparison of HANSEN's mean obliquity with that of PETERS and of LE VERRIER at different epochs is given in the following table:—

Epoch.	HANSEN.			PETERS.	LE VERRIER.	H.—P.	H.—L.
	°	'	"	"	"	"	"
1750	23	28	18.19	17.44	19.42	+ 0.75	— 1.23
1800	23	27	54.80	54.22	55.63	+ 0.58	— 0.83
1850	23	27	31.42	30.99	31.83	+ 0.43	— 0.41
1900	23	27	8.02	7.76	8.03	+ 0.26	— 0.01

The formulæ for reducing the places of the fixed stars, page 280, correspond to the *Star Tables of the American Ephemeris*, Washington, 1869.

The mean right ascensions of stars have been reduced to NEWCOMB's fundamental standard in the catalogue attached to the *Washington Observations for 1870*, Appendix II, with the following exceptions: The right ascensions of the 48 circumpolar stars north of  $60^\circ$  north declination are from Dr. GOULD's *Standard Places of Fundamental Stars*, second edition, United States Coast Survey Office, 1866. Of the twelve stars south of  $50^\circ$  south declination, the positions of  $\beta$  Hydri,  $\alpha$  Trianguli Australis, and  $\sigma$  Octantis, have been corrected from data furnished by Dr. GOULD; while the remaining nine are, as before, from the *British Nautical Almanac* for 1848.

The right ascensions of the additional stars in the general list, whose apparent right ascensions are given in a subsequent section, have been taken partly from the *Catalogue of 1098 Standard Clock and Zodiacal Stars*, forming Part IV of Vol. I of *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac*, Washington, 1881; and partly from the catalogue of the Astronomische Gesellschaft of 1878. A few have been derived from recent catalogues without a rigorous reduction for equinox.

The mean declinations of stars are taken from BOSS's paper in the *Report of the Northern Boundary Commission*, Washington, 1879, for all stars found therein. The declinations of all the other stars have been reduced to the same standard, except those of the additional ones above, which have been taken partly from the Astronomische Gesellschaft list, and partly from places in recent catalogues. To the apparent places of Sirius and Procyon have been applied the periodic corrections resulting from AUWERS's investigations.



The values of these corrections are :—

Year	Sirius.		Procyon.	
1899.0	$\Delta a = + 0.022$	$\Delta \delta = + 1.40$	$\Delta a = + 0.060$	$\Delta \delta = - 0.55$
1900.0	$\Delta a = + 0.002$	$\Delta \delta = + 1.35$	$\Delta a = + 0.054$	$\Delta \delta = - 0.68$

The ephemeris of the sun is constructed from HANSEN and OLUFSEN's *Tables du Soleil*, Copenhagen, 1853, except that STRUVE's aberration has been used. This is equivalent to adding  $0''.19$  to the true longitudes, but it does not affect the right ascensions and declinations. The sun's rectangular equatorial co-ordinates have been computed from the longitudes and latitudes by the following formulæ :—

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3 R \beta \\ Z &= R \sin \lambda \sin \omega + 44.5 R \beta \end{aligned}$$

The reductions to mean equinox, 1899.0, are computed by the formulæ,

$$\begin{aligned} \Delta X' &= + Y \sec \omega \Delta \lambda \sin 1'' \\ \Delta Y' &= - X \cos \omega \Delta \lambda \sin 1'' + Z \Delta \omega \sin 1'' - 9.4 \tau R \sin (\lambda + 186^\circ) \\ \Delta Z' &= - X \sin \omega \Delta \lambda \sin 1'' - Y \Delta \omega \sin 1'' + 21.7 \tau R \sin (\lambda + 186^\circ) \end{aligned}$$

Where—

$\lambda$  and  $\beta$  are the longitude and latitude of the sun referred to the equinox and ecliptic of the date ;

$\omega$ , the obliquity of the ecliptic ;

$\Delta \lambda$ , the reduction of longitude for precession and nutation from January 0 ;

$\Delta \omega$ , the reduction of the mean to the apparent obliquity ;

$\tau$ , the fraction of the year since January 0.

The numerical coefficients are in units of the seventh place of decimals. The correction for latitude has been taken from GOETZE's paper in the *Astronomical Journal*, Vol. II, page 71.

The mean equatorial horizontal parallax of the sun, adopted from Professor NEWCOMB's *Investigation of the Distance of the Sun and the Elements which depend on it*,\* is  $8''.848$ . The adopted semidiameter of the sun at the earth's mean distance is  $16' 2''$ . In the computations pertaining to eclipses, BESSEL's semidiameter,  $15' 59''.788$  has been used.

The right ascension, declination and parallax of the moon are derived from HANSEN's *Tables de la Lune*, London, 1857, the mean longitude being corrected in accordance with NEWCOMB's *Researches on the Motion of the Moon*, Part I, page 268,† and a corrected table being substituted for Table XXXIV.

The semidiameter of the moon is computed from the moon's horizontal parallax by the formula,

$$S = 0.272274 \pi + 2''.5$$

The constant  $2''.5$  is omitted in the computation of eclipses and occultations, as due entirely to telescopic and ocular irradiation.

The ephemeris of Mercury is derived from Professor WINLOCK's *Tables of Mercury*, Washington, 1864. They are based on the older theory of LE VERRIER, published in the *Additions to the Connaissance des Temps* for 1848.

The ephemeris of Venus is derived from Mr. G. W. HILL's *Tables of Venus*, Washington, 1872.

The ephemeris of Mars is derived from manuscript tables constructed from LINDENAU's Tables. Mr. HUGH BREEN's results, contained in his paper *On the Corrections of LINDENAU's Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX, have

\* *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1865*, Appendix II.

† *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1875*, Appendix II.

also been discussed and applied; and LE VERRIER'S secular variations of the elements are likewise adopted. The perturbations produced by Jupiter have been numerically increased by  $\frac{1}{80}$  of their value. The following are the corresponding corrected elements and annual variations for Washington, 1855.0:—

$$\begin{aligned}
 L &= 320^{\circ} 13' 33.87'' + 689101.1527 t \\
 \pi &= 333^{\circ} 23' 17.84'' + 65.9990 t \\
 \Omega &= 48^{\circ} 25' 55.29'' + 27.6997 t \\
 i &= 1^{\circ} 51' 2.20'' - 0.02141 t \\
 e &= 19238''.75 + 0.18549 t \\
 n &= 689050''.8927 \\
 a &= 1.5236915
 \end{aligned}$$

The ephemerides of Jupiter and Saturn are derived from the tables constructed by Mr. GEORGE W. HILL.

The ephemerides of Uranus and Neptune are derived from Professor NEWCOMB'S Tables, published by the *Smithsonian Institution*.

The semidiameters of the planets are computed from the following values:—

	Semidiameter.	Log Dist.	Authority.
Mercury	3.34	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	8.546 $\pm$ 0.086	0.00	PEIRCE, from the Washington Observations of 1845 and 1846, made with the Mural Circle.
Mars	2.842 $\pm$ 0.057	0.25	
Jupiter (polar)	18.78 $\pm$ 0.067	0.70	
Saturn (polar)	8.77 $\pm$ 0.039	0.95	
Uranus	1.68 $\pm$ 0.3	1.30	
Neptune	1.28	1.48	
Jupiter (equatorial)	20.00	0.70	
Saturn (equatorial)	9.38	0.95	

The elements of eclipses of the sun and occultations of stars by the moon are given in accordance with BESSEL'S method, using the special forms in CHAUVENET'S *Spherical and Practical Astronomy*. The constants adopted for the eclipses arc:—

Sun's mean equatorial horizontal parallax . . . . .	8.800
Semidiameter of the sun at distance unity, BESSEL . . .	959.788
Ratio of radius of moon to radius of earth, BURCKHARDT .	0.27227

The eclipses of Jupiter's satellites are computed from TODD'S *Continuation of DAMOISEAU'S Tables*, Washington, 1876. The occultations, transits, etc., are computed from WOOLHOUSE'S Tables, *British Nautical Almanac* for 1835, Table II of each satellite having been adapted to DAMOISEAU'S Tables.

The elongations and conjunctions of the satellites of Saturn are computed from manuscript tables prepared by Professor NEWCOMB.

The apparent elements of the rings of Saturn are computed from BESSEL'S data, except those for the dusky ring.

The elongations of the satellites of Uranus, and of the satellite of Neptune are computed from the data of Professor NEWCOMB'S *Uranian and Neptunian Systems*, Washington, 1875.

In compiling the positions of observatories, the latest available data have been used. The positions have been furnished, in many instances, through the courtesy of the directors of the Observatories, in response to a circular issued by the Superintendent of the American Ephemeris.

The reduction to geocentric latitude, and the logarithm of the radius of the earth, are derived from CLARKE'S elements of the terrestrial spheroid, as adopted by the U. S. Coast and Geodetic Survey.

$$\log e = 8.9152503$$

$$\varphi' - \varphi = -11' 40''.43 \sin 2 \varphi + 1''.19 \sin 4 \varphi$$

$$\log \rho = 9.9992645 + 0.0007374 \cos 2 \varphi - 0.0000019 \cos 4 \varphi$$

Table IV, for finding the latitude from an observed altitude of Polaris, is constructed for—

- (1) An altitude of Polaris equal to  $45^\circ$ .
- (2) A declination of Polaris equal to  $+88^\circ 46'.1$ .

The principal computations of the Ephemeris have been distributed in the following manner:—

The ephemeris of the Sun was computed by Mrs. E. B. DAVIS; the Moon's longitude, latitude, semidiameter and horizontal parallax, by Professor KEITH; the right ascension and declination in the office of the British Nautical Almanac, by an arrangement for exchange of work with that office; the culminations, by Professor W. W. HENDRICKSON; the lunar distances, by Mr. BRADFORD; Mercury and Venus, by Mr. E. P. AUSTIN; Mars, Jupiter, Saturn, Uranus, and Neptune, by Mr. ROBERDEAU BUCHANAN; Jupiter's satellites, by Professor H. D. TODD; the satellites of Saturn, Uranus, and Neptune, by Mr. C. KEITH. The mean and apparent places of the fixed stars were prepared by Mr. HEDRICK, Miss E. A. HEDRICK, and Mr. W. AUHAGEN; the general constants for their reduction, by Mr. BUCHANAN; the occultations, by Mr. AUHAGEN; and the eclipses were computed and the charts projected by Mr. BUCHANAN.

TABLE I.

**CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S  
MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING  
TO A CORRECTED LUNAR DISTANCE.**

Approximate Interval.		DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																												
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52			
h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
0	10	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3			
0	20	0	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6			
0	30	0	1	1	2	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9			
0	40	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	7	8	8	9	9	10	10	10	11	11			
0	50	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	12	13	13			
1	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14	14			
1	10	1	1	2	2	3	4	4	5	6	6	7	8	8	9	9	10	10	11	11	12	12	13	14	14	15	15			
1	20	1	1	2	3	3	4	4	5	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	15	16	16			
1	30	1	1	2	3	3	4	4	5	6	7	8	8	9	10	11	11	12	12	13	14	14	15	16	16	17	17			
		DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																												
		54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100					
h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
0	10	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	7				
0	20	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	12				
0	30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	14	15	15	16	16	16	17	17	17	17				
0	40	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	20	20	20	21	21	21	22				
0	50	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	22	23	23	24	24	25	25				
1	0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28	28				
1	10	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	29	30				
1	20	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31	31				
1	30	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	29	30	31	31	31	31				
		DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																												
		102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138										
h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
0	10	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9				
0	20	13	13	13	13	14	14	14	14	15	15	15	15	15	15	16	16	16	16	16	16	17	17	17	17	17				
0	30	18	18	18	19	19	19	20	20	20	21	21	21	22	22	22	23	23	23	24	24	24	24	24	24	24				
0	40	22	22	23	23	24	24	25	25	25	26	26	27	27	27	28	28	28	29	29	29	30	30	30	30	30				
0	50	26	26	26	27	27	28	29	29	29	30	30	31	31	31	32	32	33	33	33	34	34	34	34	34	34				
1	0	28	29	29	30	30	31	31	32	33	33	34	34	35	35	36	36	37	37	37	38	38	38	38	38	38				
1	10	30	31	31	32	32	33	34	34	35	35	36	36	37	37	38	38	39	39	39	40	40	40	40	40	41				
1	20	31	32	33	33	34	34	35	35	36	37	37	38	38	39	39	40	40	41	41	41	42	42	42	42	42				
1	30	32	32	33	34	34	35	35	36	36	37	38	38	39	39	40	40	41	42	42	42	42	42	42	42	43				

The correction is to be added to the approximate Greenwich time when the proportional logarithms in the Ephemeris are decreasing, and subtracted when they are increasing.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Sidereal.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0	0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	0.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161
Sidereal.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.									
Sidereal.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	18.636	18.466	18.296	18.125	17.955	17.784	17.614	17.443	0 0.000
1	18.800	18.630	18.459	18.289	18.119	17.948	17.778	17.607	1 0.003
2	18.964	18.794	18.623	18.453	18.282	18.112	17.941	17.771	2 0.005
3	19.128	18.958	18.787	18.617	18.446	18.276	18.105	17.935	3 0.008
4	19.292	19.121	18.951	18.780	18.610	18.440	18.269	18.099	4 0.011
5	19.456	19.285	19.115	18.944	18.774	18.603	18.433	18.263	5 0.014
6	19.619	19.449	19.279	19.108	18.938	18.767	18.597	18.426	6 0.016
7	19.783	19.613	19.442	19.272	19.101	18.931	18.761	18.590	7 0.019
8	19.947	19.777	19.606	19.436	19.265	19.095	18.924	18.754	8 0.022
9	20.111	19.940	19.770	19.600	19.429	19.259	19.088	18.918	9 0.025
10	20.275	20.104	19.934	19.763	19.593	19.423	19.252	19.082	10 0.027
11	20.439	20.268	20.098	19.927	19.757	19.586	19.416	19.245	11 0.030
12	20.602	20.432	20.261	20.091	19.921	19.750	19.580	19.409	12 0.033
13	20.766	20.596	20.425	20.255	20.084	19.914	19.744	19.573	13 0.035
14	20.930	20.760	20.589	20.419	20.248	20.078	19.907	19.737	14 0.038
15	21.094	20.923	20.753	20.583	20.412	20.242	20.071	19.901	15 0.041
16	21.258	21.087	20.917	20.746	20.576	20.405	20.235	20.065	16 0.044
17	21.422	21.251	21.081	20.910	20.740	20.569	20.399	20.228	17 0.046
18	21.585	21.415	21.244	21.074	20.904	20.733	20.563	20.392	18 0.049
19	21.749	21.579	21.408	21.238	21.067	20.897	20.727	20.556	19 0.052
20	21.913	21.743	21.572	21.402	21.231	21.061	20.890	20.720	20 0.055
21	22.077	21.906	21.736	21.565	21.395	21.225	21.054	20.884	21 0.057
22	22.241	22.070	21.900	21.729	21.559	21.388	21.218	21.048	22 0.060
23	22.404	22.234	22.064	21.893	21.723	21.552	21.382	21.211	23 0.063
24	22.568	22.398	22.227	22.057	21.887	21.716	21.546	21.375	24 0.066
25	22.732	22.562	22.391	22.221	22.050	21.880	21.709	21.539	25 0.068
26	22.896	22.726	22.555	22.385	22.214	22.044	21.873	21.703	26 0.071
27	23.060	22.889	22.719	22.548	22.378	22.208	22.037	21.867	27 0.074
28	23.224	23.053	22.883	22.712	22.542	22.371	22.201	22.031	28 0.076
29	23.387	23.217	23.047	22.876	22.706	22.535	22.365	22.194	29 0.079
30	23.551	23.381	23.210	23.040	22.869	22.699	22.529	22.358	30 0.082
31	23.715	23.545	23.374	23.204	23.033	22.863	22.692	22.522	31 0.085
32	23.879	23.708	23.538	23.368	23.197	23.027	22.856	22.686	32 0.087
33	24.043	23.872	23.702	23.531	23.361	23.191	23.020	22.850	33 0.090
34	24.207	24.036	23.866	23.695	23.525	23.354	23.184	23.013	34 0.093
35	24.370	24.200	24.029	23.859	23.689	23.518	23.348	23.177	35 0.096
36	24.534	24.364	24.193	24.023	23.852	23.682	23.512	23.341	36 0.098
37	24.698	24.528	24.357	24.187	24.016	23.846	23.675	23.505	37 0.101
38	24.862	24.691	24.521	24.351	24.180	24.010	23.839	23.669	38 0.104
39	25.026	24.855	24.685	24.514	24.344	24.173	24.003	23.833	39 0.106
40	25.190	25.019	24.849	24.678	24.508	24.337	24.167	23.996	40 0.109
41	25.353	25.183	25.012	24.842	24.672	24.501	24.331	24.160	41 0.112
42	25.517	25.347	25.176	25.006	24.835	24.665	24.495	24.324	42 0.115
43	25.681	25.511	25.340	25.170	24.999	24.829	24.658	24.488	43 0.117
44	25.845	25.674	25.504	25.333	25.163	24.993	24.822	24.652	44 0.120
45	26.009	25.838	25.668	25.497	25.327	25.156	24.986	24.816	45 0.123
46	26.172	26.002	25.832	25.661	25.491	25.320	25.150	24.979	46 0.126
47	26.336	26.166	25.995	25.825	25.655	25.484	25.314	25.143	47 0.128
48	26.500	26.330	26.159	25.989	25.818	25.648	25.477	25.307	48 0.131
49	26.664	26.493	26.323	26.153	25.982	25.812	25.641	25.471	49 0.134
50	26.828	26.657	26.487	26.316	26.146	25.976	25.805	25.635	50 0.137
51	26.992	26.821	26.651	26.480	26.310	26.139	25.969	25.798	51 0.139
52	27.155	26.985	26.815	26.644	26.474	26.303	26.133	25.962	52 0.142
53	27.319	27.149	26.978	26.808	26.637	26.467	26.297	26.126	53 0.145
54	27.483	27.313	27.142	26.972	26.801	26.631	26.460	26.290	54 0.147
55	27.647	27.476	27.306	27.136	26.965	26.795	26.624	26.454	55 0.150
56	27.811	27.640	27.470	27.299	27.129	26.959	26.788	26.618	56 0.153
57	27.975	27.804	27.634	27.463	27.293	27.122	26.952	26.781	57 0.156
58	28.138	27.968	27.797	27.627	27.457	27.286	27.116	26.945	58 0.158
59	28.302	28.132	27.961	27.791	27.620	27.450	27.280	27.109	59 0.161
Sidereal.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0	0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1	0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2	0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3	0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4	0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5	0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6	0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7	0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8	0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9	0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10	0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11	0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12	0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13	0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14	0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15	0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16	0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17	0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18	0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19	0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20	0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21	0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22	0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23	0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24	0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25	0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26	0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27	0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28	0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29	0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30	0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31	0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32	0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33	0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34	0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35	0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36	0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37	0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38	0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39	0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40	0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41	0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42	0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43	0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44	0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45	0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46	0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47	0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48	0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49	0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50	0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51	0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52	0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53	0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54	0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55	0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56	0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57	0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58	0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59	0.161
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

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TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	0 0.000	0 9.856	0 19 713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0 0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1 0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2 0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3 0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4 0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5 0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6 0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7 0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8 0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9 0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10 0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11 0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12 0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13 0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14 0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15 0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16 0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17 0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18 0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19 0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20 0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21 0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22 0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23 0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24 0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25 0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26 0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27 0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28 0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29 0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30 0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31 0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32 0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33 0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34 0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35 0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36 0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37 0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38 0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39 0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40 0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41 0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42 0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43 0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44 0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45 0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46 0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47 0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48 0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49 0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50 0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51 0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52 0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53 0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54 0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55 0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56 0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57 0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58 0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59 0.162
Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.



